plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

JUNE 1955
Convention - Exposition
Issue

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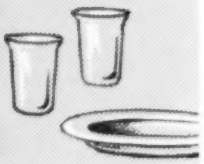

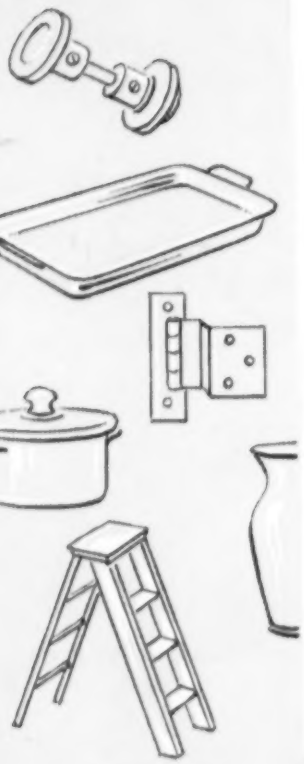

Have you a PROBLEM in your anodizing work? if it is cleaning, we would recommend for your consideration

CLEPO 86-P A non-etch type Alkaline soak cleaner

CLEPO 30-R An etch-type non-scaling alkaline cleaner.

CLEPO 85-AN A non-etch type Alkaline washing machine cleaner.

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If you have no particular PROBLEM.

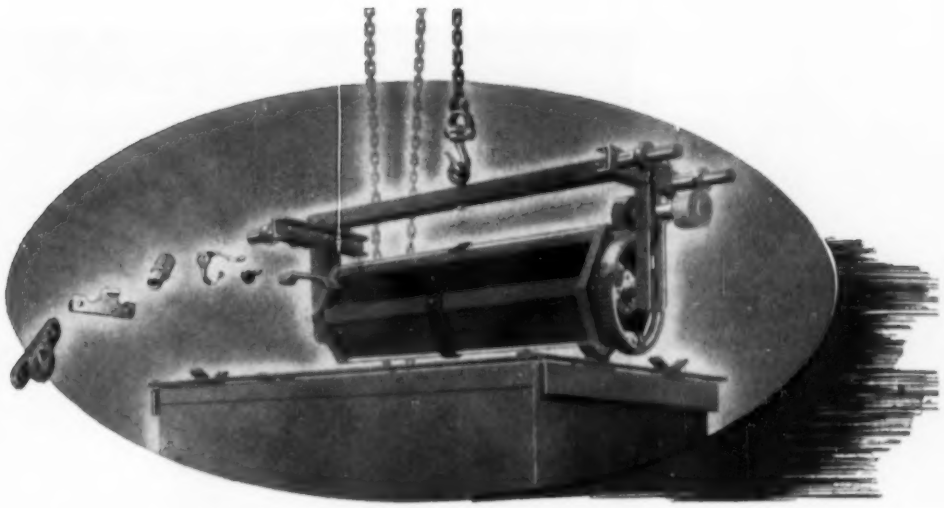
but want to keep up to date, we would suggest a simple, inexpensive, rapid new process for cleaning Aluminum before anodizing and for stripping racks in one chemical operation. Lettering, Dirt, Oil, Water Stains, corrosion and anodized coatings are removed rapidly with negligible attack on the base metal.

Your CLEPO Service man will be glad to demonstrate these materials for you.

FREDERICK **GUMM** *Chemical Company Inc.*

538 FOREST STREET, KEARNY, N. J.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 600.



Plating on Aluminum made EASY with Alumon

Hundreds of manufacturers throughout the United States are now using electroplated aluminum. The Alumon process is simple. The work is merely cleaned, dipped in acid, dipped in Alumon and is then ready for electroplating with copper, nickel, and other metals. The process is suitable for plating most wrought and cast alloys. . . The cost of using Alumon is low, being less than half a cent per square foot of surface area treated. The process can be fitted easily into regular plating cycles. Bulk or barrel plating readily done. Upon request we'll gladly send you the Alumon Process Bulletin.

Write for literature on Alumon and check list of literature on sixty Enthone products and processes for better metal finishing.

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METAL FINISHING PROCESSES

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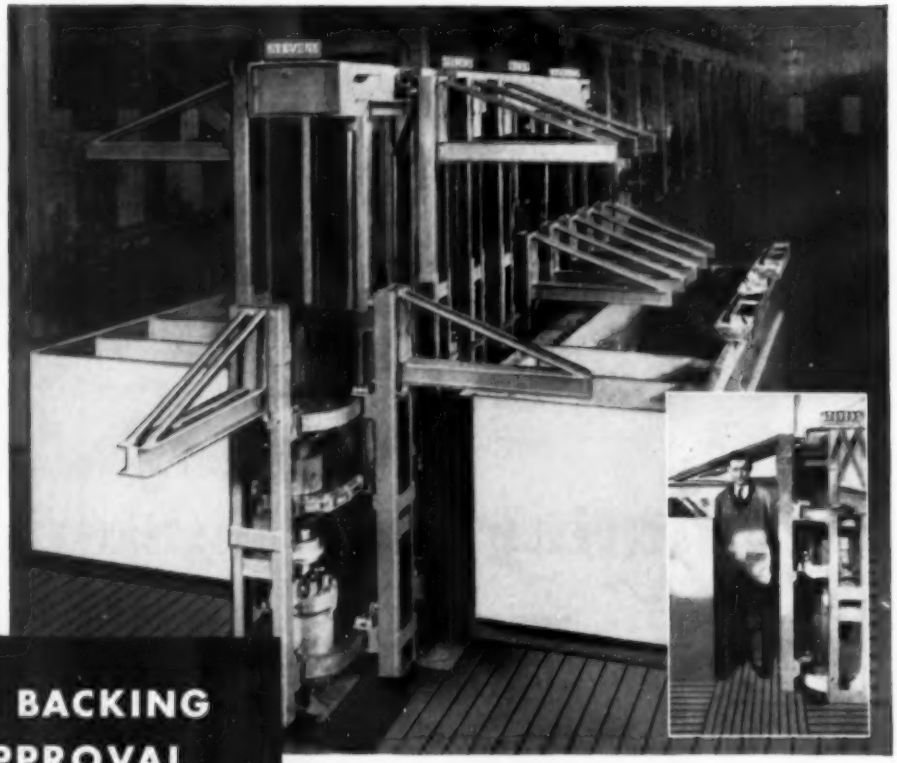
INCORPORATED
442 ELM STREET
NEW HAVEN, CONNECTICUT

ELECTROPLATING CHEMICALS



THEY ARE BACKING THEIR APPROVAL WITH ORDERS . . . . .

FOR THE NEW "STEVADOER" PLATING AND PROCESSING MACHINE *by* STEVENS

Discriminating metal finishing experts who have viewed it in operation are strong in their approval of the "Stevadoer," new automatic plating and processing machine by Stevens . . . and they are backing up their approval with orders.

The "Stevadoer" is all that its name implies – strong, rugged, with smooth vertical and horizontal movement. In addition it provides unlimited lift and heavy load capacity.

The side-arm design, pioneered by Stevens, which eliminates operating mechanism over solutions, still provides for delayed set-down mechanisms and skip tracks.

You'll like the featured "built-in" safety cat walk that can be provided between the processing tanks and the mechanism on two-row machines, making anode servicing and tank or mechanical inspection an easy matter.

The new Stevens Stev-O-Matic automatic loader and unloader working with the new "Stevadoer" offers the last word in automation.

Write today for more information on this remarkable new machine for metal finishing.

See another new Stevens engineering triumph . . . the new "Little Steve" Automatic Plating Machine at the 4th Industrial Finishing Exposition – Booth 112, Public Auditorium – June 20 to 23, Cleveland, Ohio.

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Metal Finishing equipment and supplies from castings or stampings to finished product.

FREDERIC B. STEVENS INCORPORATED

YOUR METAL FINISHING SUPERMARKET

DETROIT 16, MICHIGAN

Dedicated to the improvement and dissemination of the knowledge of the arts and sciences of electroplating and of finishing of metals and of allied arts

plating

Journal of the American Electroplaters' Society

June 1955 **Vol. 42, No. 6**

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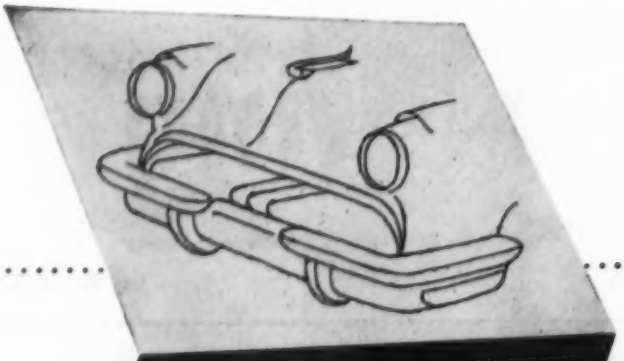

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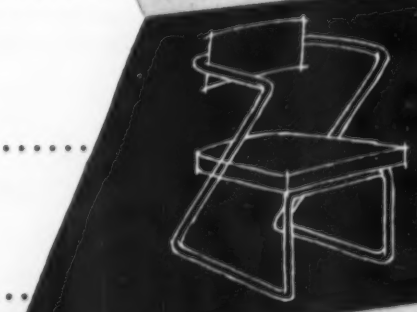
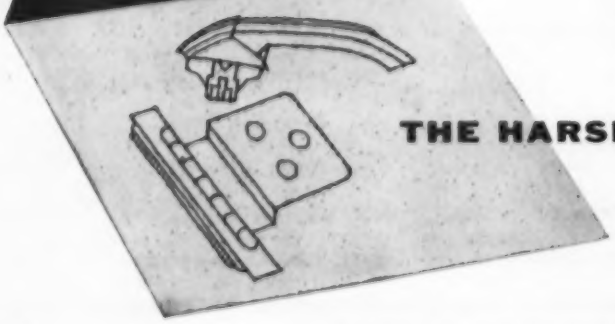
electroplating CHEMICALS and ANODES





nickel plating

. . . still and barrel . . . nickel anodes—all commercial grades and sizes . . anode bags . . . single nickel salts—nickel chloride . . . nickel carbonate . . . nickel fluoborate . . . boric acid.

chromium plating

. . pure "Krome Flake" 99.8% CrO_3 . . . sulphates less than .10% . . . lead, tin-lead and antimony-lead anodes.

copper plating

. . . copper ball anodes . . . Rochelle Salts . . . sodium and copper cyanides . . . copper sulfate . . . copper fluoborate.

cadmium plating

. . . ball and cast cadmium anodes . . . cadmium oxide . . . sodium cyanide . . . cadmium fluoborate.

tin plating

. . . cast tin anodes . . . sodium stannate . . . stannous sulfate . . . tin fluoborate . . . acid tin addition agent.

zinc plating

. . . ball and cast zinc anodes . . . sodium and zinc cyanide . . . zinc sulfate . . . zinc fluoborate.

lead plating

. . . cast lead anodes . . . lead fluoborate.

silver plating

. . . silver cyanide.

THE HARSHAW CHEMICAL COMPANY

Cleveland 6, Ohio

Chicago 10, Ill. • Cincinnati 13, Ohio • Detroit 28, Mich.
Houston 11, Texas • Los Angeles 22, Calif. • Philadelphia 48, Pa.
Pittsburgh 22, Pa. • New York 17, N. Y.

Editorial

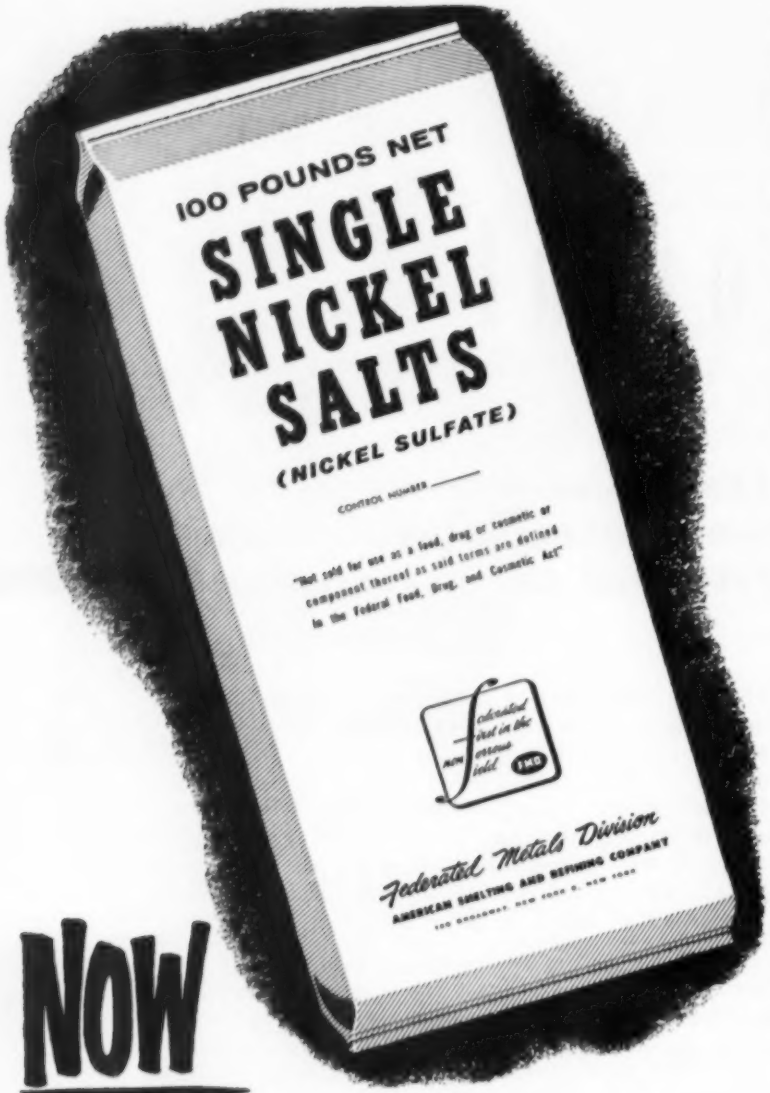
AES Member—Get Ready for the 41th Industrial Finishing Exposition and the 42nd Annual Convention

DURING the third week of June, the American Electroplaters' Society will provide its members and guests of the metal finishing industry the greatest opportunity in its history for the free exchange of ideas. The educational sessions of the Convention, along with the exhibits of over one hundred and thirty manufacturers of supplies and equipment in this field, will provide the stimuli for the optimum intermingling of theoretical, technical and practical ideas for the advancement of our industry.

Only at a combination exposition and convention are you able to observe and learn in four short days what the metal finishing field—the industry which provides your livelihood and mine—has accomplished today and what its plans are for tomorrow. The 1955 Exposition and Convention provide the opportunity to observe a great array of practical demonstrations of how your fellow members plan and solve their specialized problems. The AES members and guests with whom you meet and hold that familiar convention chat are important cogs in your future plans and achievements.

We are all familiar with the ease whereby an idea or an observation in one specialized technical area can be transplanted to aid in the solution of your problems in allied fields. The AES provides you with the opportunity "to come, to see, to conquer" at the Cleveland exposition and convention.

Ralph A Schaefer


100 POUNDS NET
SINGLE NICKEL SALTS
(NICKEL SULFATE)
CONTROL NUMBER
"Not sold for use as a food, drug or cosmetic or component thereof as said terms are defined in the Federal Food, Drug, and Cosmetic Act"
Federated first in the new nonferrous field
FMD
Federated Metals Division
AMERICAN SMELTING AND REFINING COMPANY

NOW from Federated!

Federated Metals is now supplying top quality domestic nickel salts. These are made by Federated under consistent quality control that assures you full nickel content and identical plating characteristics from every lot. Try Federated nickel salts. Call the nearest Federated office for the name of the Federated Distributor in your territory.

Try Federated, too, for all your plating anodes: Lead—including our famous Conducta-Core anode—Cadmium, Zinc, Brass, Copper, Tin and Tin-Lead. All sizes and shapes are available from Federated or from specialized distributors in your area.

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
IN CANADA: FEDERATED METALS CANADA, LTD., TORONTO AND MONTREAL

Federated first in the new nonferrous field FMD

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead and Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

Cover Story

THERE was a necessity to express pictorially, and therefore succinctly, the universality of an entire industry as well as its pin-pointed location. There were many ways to do this, of course, but a means had to be invented which would be at once full of meaning to the uninitiated as well as the highly artistic. Some sort of compromise had to be reached.

Our cover for this issue is the product of that compromise: a bright four-colored world, silhouetted against a view of Cleveland in which the great Exposition and Convention will take place, together with spots of additional color carefully placed to call attention where necessary. We feel that we have achieved a three dimensional effect and the startling message we set out to tell.

In looking about for a suitable symbol, we chose the excellent art work used by Union Carbide and Carbon Corporation. Their long series of ads featuring hands have always been an attractive symbolism. This one seemed to fit our needs wonderfully well. We are deeply indebted to Union Carbide and Carbon Corporation for their courtesy in allowing us to use their plates from which the greater part of our cover was made.

In all, five plates make up the final product. We feel that the engravers, Essex Art Engraving Company of Newark, N. J., deserve a special bow for the excellence of the plates they made. Our printers, too, Westbrook Publishing Company of Philadelphia, Pa., must be commended for the patience, care and excellence of the product.

It is our fond hope that this cover will measure up to size, scope and meaning of the great Industrial Finishing Exposition and Convention to be held this month in Cleveland.

The finishing world meets in Cleveland.

See You at The . . .

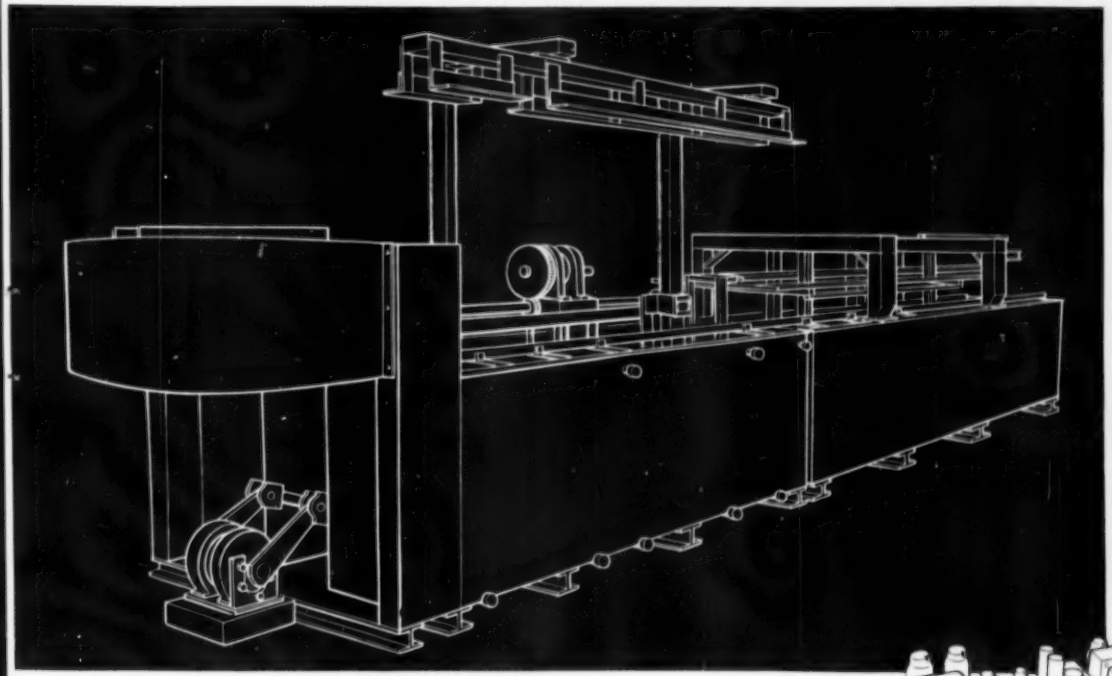
"DOUBLE HEADER"
IN CLEVELAND

1955 INDUSTRIAL FINISHING EXPOSITION

Sponsored By
AMERICAN ELECTROPLATERS' SOCIETY

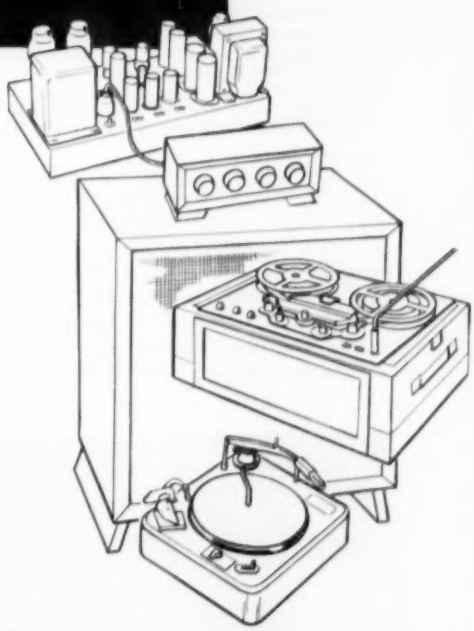
In Conjunction With Their
42ND ANNUAL CONVENTION

GIVE ME A NAME AND YOU MAY WIN THIS



CUSTOM SET OF HI-FI AUDIO EQUIPMENT

- Turntable with Pickup
- Amplifier with Remote Control
- Speaker Cabinet
- Tape Recorder



Yes, here's all you have to do! Give this new Wagner Brothers Full Automatic Plating machine a suitable name and you may win this wonderful array of high fidelity sound equipment which will add new dimensions to your music listening enjoyment. Contest rules are simple and there's absolutely no obligation for you to buy anything. See the equipment in actual operation at the 1955 Industrial Finishing Exposition or write for descriptive literature now.

CONTEST RULES

1. This is an Official Contest Blank. You may clip it and deposit it at Wagner Booths 488-504, Industrial Finishing Exposition. Extra copies are also available at the booth.

2. All entries must be PERSONALLY DEPOSITED AT WAGNER BROTHERS' BOOTH during the exposition. Mailed entries cannot be considered.

3. Contest closes at 2:00 pm on June 23rd. The winner will be publicly announced at the conclusion of the Convention.

4. Your entry must be on an Official Contest Blank to be eligible and must be the original work of the contestant submitting it. In case of duplication, the earliest entry will be chosen. There is no limitation on number of names submitted.

5. Anyone attending the 1955 Industrial Finishing Exposition is eligible to enter. Not eligible are employees of these firms and their immediate families: Wagner Brothers, Inc.; Wagner Brothers Equipment Co., Wagner Brothers' dealers and representatives, Bingham Technical Advertising.

6. The final selection will be made by a committee composed of leading representatives of the plating industry, Wagner Brothers, Inc., Bingham Technical Advertising. Entries will be judged on the basis of sincerity, originality and aptness of thought. The decision of the judges is final and no entries can be returned. All entries, contents and ideas therein become the property of Wagner Brothers, Inc. who are under no obligation to use or publish names or ideas submitted.

DO NOT MAIL

Must be delivered to Wagner Brothers' Booths 488-504, Industrial Finishing Exposition, Cleveland Public Auditorium, Cleveland, Ohio, to be valid.

☐ I will not attend the exposition but would like literature describing this new automatic plater.

OFFICIAL CONTEST ENTRY BLANK

I suggest you name the new Wagner Brothers Full Automatic Plater the .....

.....

(One word, two words or hyphenated words acceptable)

YOUR NAME ..... TITLE .....

YOUR FIRM .....

COMPANY ADDRESS .....

CITY ..... ZONE ..... STATE .....

See the NEW AUTOMATIC PLATER in Operation JUNE 20-23 at the 1955 Industrial Finishing Exposition

WAGNER BROTHERS, INC., 400 MIDLAND AVE., DETROIT 3, MICHIGAN

INDICATE A 605.

Industry News

HONORED—Y. Frank Freeman, left, chairman of the Southern California observance of Invest in America Week, and Harold Voeglin, president of Los Angeles Junior Chamber of Commerce, present Free Enterprise awards for public relations service to Thomas H. Pender, third from left, of Robertshaw-Fulton Controls Company's Grayson Controls Division, and A. O. Appel, of the Santa Fe Railway. Robertshaw-Fulton's Grayson Division won the first annual Alexander Hamilton Free Enterprise Award as a highlight of Invest in America Week. A special award of merit was presented to Sante Fe Railway

Pennsalt Metal Processing Salesmen Get Complete Story on Newly-Acquired Drawcote Line. Gilron's Drawcote and the Pennsylvania Salt Manufacturing Company's line of lubricants, became full-fledged partners at the recent meeting of Pennsalt and Gilron metal processing salesmen and service engineers. With details of the annexation of the Gilron Company by Pennsalt complete, Pennsalt salesmen and engineers from all parts of the country met for three days at the Skytop Club in Pennsylvania's Pocono Mountains where they got a first-hand report from Gilron executives and technicians on the history, development and technical features of the highly-successful Gilron line of dry soap lubricants which they will now offer customers in addition to their own well-known Pennsalt Fos and metal cleaners line.

Jack Mordica, Gilron Manager, explains history and development of Drawcote line to Pennsalt sales and service men at three-day sales conference. Others participating in this work session (from left) are: Ernie Erickson, service engineer; Gene Edwards, Assistant Manager, Gilron; and Phil Rech, metal processing salesman

Seven Hundred Fifty Automatic Machines. Frederic B. Stevens, Inc., metal finishing equipment and supply manufacturer, recently saw their 750th Automatic Plating and Processing Machine installed.

The 750th machine, a Stevens Full Automatic Barrel Plating Machine was installed at the Spectranome Plating Co., New York, and will be used for high quality and production nickel plating of pencil clips and similar parts.

Of the 750 machines, the Stevens Organization has engineered and manufactured, over 100 have been full automatic barrel plating and processing units for American and Canadian industry. The wide acceptance of this equipment is based on the fact that manufacturers such as Spectranome Plating Co. have found that parts can be finished to a higher lustre and brilliant finish with better quality in the Stevens Full Automatic Barrel Machine at a big savings in manpower over previous manual horizontal barrel methods.

The company's first 750 machines have been and are being used by practically every major manufacturing firm in the United States requiring an immersion type finish at some stage in their manufacturing operations. Many metal finishing job shops also are benefiting from the advantages of automatic rack or barrel processing.

The first 750 Stevens machines have been used with the following processes: paint preparation and rustproofing; aluminum and magnesium finishing; brass and aluminum descaling and/or bright dipping; all types of electroplating; conversion coatings, metal dipping; metal washing, cleaning and/or pickling; electropolishing; stripping, etc.

"Stevens 750th machine marks a significant chapter in the metal finishing industry which has seen the widespread acceptance of automatic techniques and equipment occur in a period of less than 15 years," remarked Frank Watt, Stevens General Sales Manager, during an interview with company officials.

A. B. Hoefer, Stevens Vice-President, added that, "The next few years will see even greater advances in the field of automatic loading and unloading, making possible complete automation in the plating and finishing departments. Stevens

avoid stream pollution due to chromium waste...

...with W&T Sulphur Dioxide Reduction Equipment

With the proper treatment equipment, toxic hexavalent chromium can be reduced by sulphur dioxide to the trivalent form and then completely precipitated by alkali for standard removal to a disposal area — such as a lagoon. After this treatment the waste water can be drawn off and safely disposed of in the usual manner. This treatment is in full compliance with most local and state pollution abatement laws.

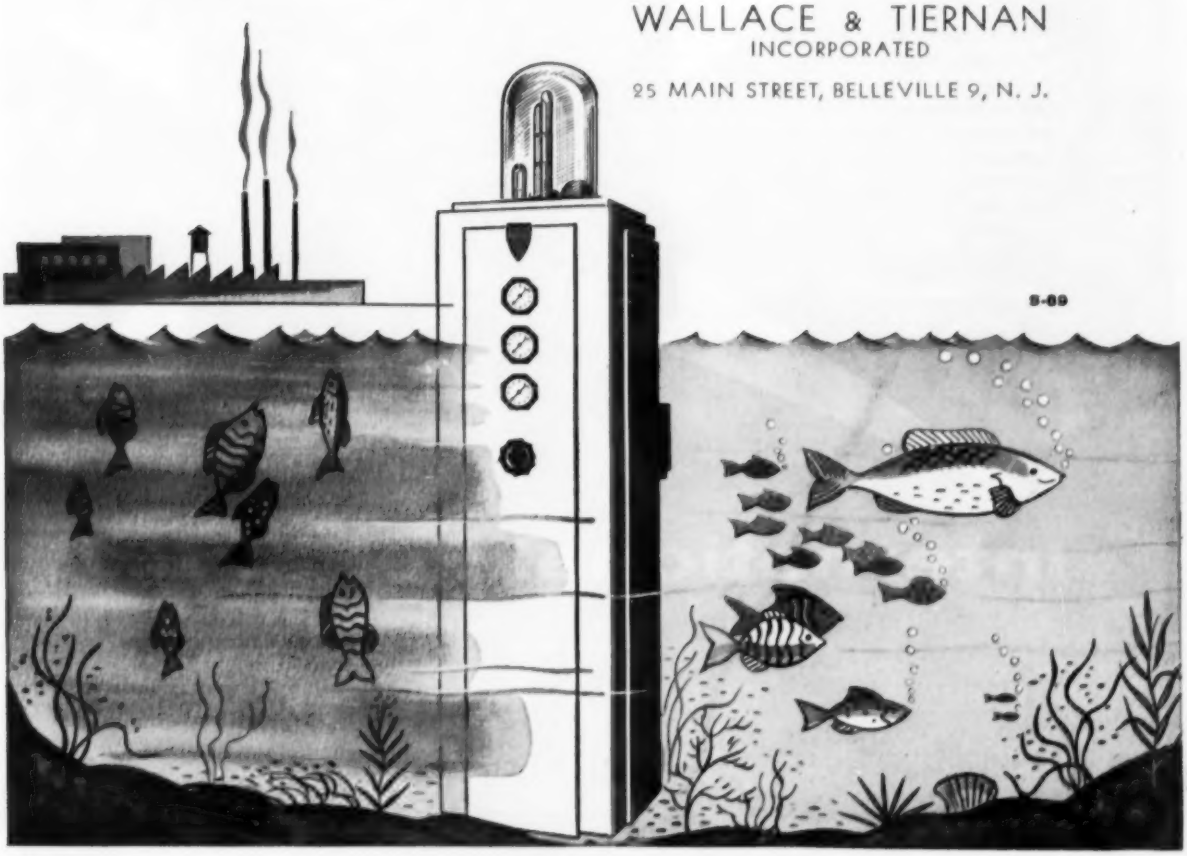
Wallace & Tiernan offers the heat treating and metal finishing industries several types of Sulphur Dioxide Feeders with optional controls for manual, semi-automatic or fully automatic operation. These feeders are adaptable to either the "batch" or "flow-thru" methods of treatment in both large and small plants.

Similar equipment is also available for the destruction of cyanide waste by alkaline chlorination.

W&T offers PROVEN EQUIPMENT — hundreds of similar units are serving industry today, EXPERIENCE — over forty years of building chemical feeding equipment, and SERVICE — field representatives are located in principal cities throughout the country.

Write today for additional information on W&T Sulphur Dioxide Feeders and Alkaline Chlorination Equipment, at no obligation to you, of course.

WALLACE & TIERNAN
INCORPORATED
25 MAIN STREET, BELLEVILLE 9, N. J.



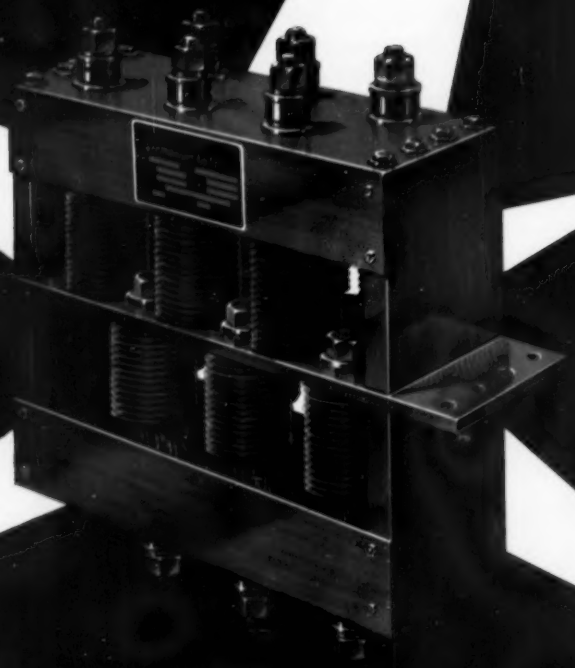
S-89

International Rectifier Corporation

proudly presents

International

germanium power rectifiers!



This new line of
Power Rectifiers features:

- High efficiency . . . up to 97%
- Lowest forward drop
- High reverse to forward ratio
- No reforming required after storage
- Unlimited life expectancy
- Ratings:
  26 to 66 AC input volts per junction
  150 to 100,000 amps DC output

Operating temperature range
55 C to + 75 C

International Rectifier

CORPORATION

EXECUTIVE OFFICES: 1521 E. GRAND AVE., EL SEGUNDO, CALIFORNIA • PHONE OREGON 8-6281
New York Office: 501 Madison Avenue, Phone PLaza 3-4942 • Chicago Office: 205 West Wacker Drive, Phone FRanklin 2-3889
In Canada: Atlas Radio Corp., Ltd., 50 Wingold Ave. W., Toronto, Ontario • Phone RU 1-6174

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 607.

JOIN IN THE RUN

TO BOOTH 201

THE BIG SHOW: AES CONVENTION

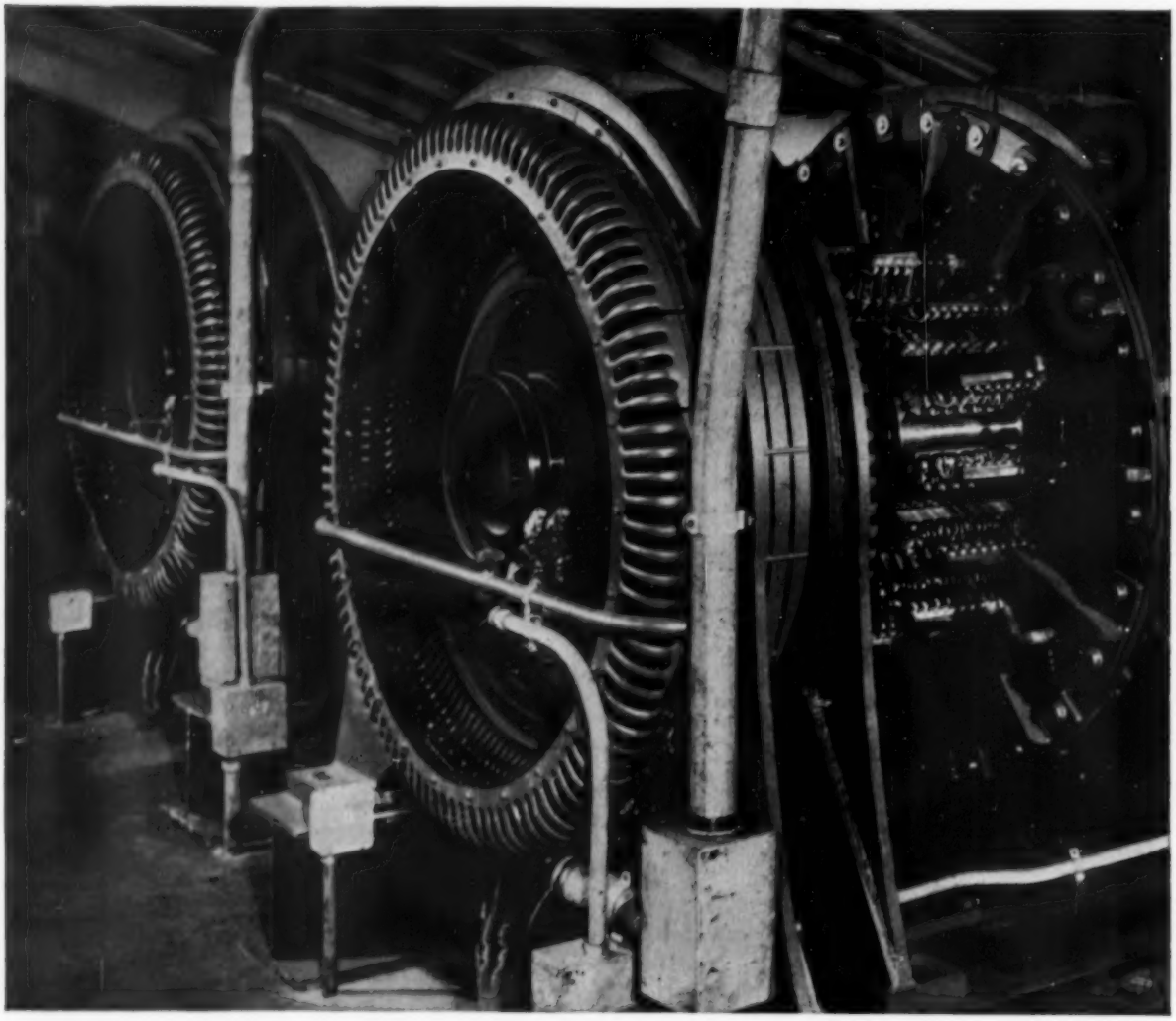
THE PLACE: CLEVELAND PUBLIC AUDITORIUM

THE TIME: JUNE 20, 21, 22, 23, 1955

Booth 201 is "under wraps" until showtime. But here's a hint. You'll get the best ideas, you'll see the most innovations for boosting your plating profits, while saving manhours, and costs . . . all at Booth 201. You'll learn why "formed shapes" aren't for plating cylinders, and you'll see "living" proof. Advance information will be revealed about the latest developments in automatic horizontal barrel plating equipment that tops the field . . . the co-operative achievements of The Meaker Company and G. S. Equipment. You're invited to Booth 201, the feature attraction of the 1955 AES Exposition. See you there!

THE G. S. EQUIPMENT CO.

5319 St. Clair Ave. • Cleveland 3, Ohio
EN 1-0167, 1-3541



YOU SAVE 4 WAYS WITH Chandeysson GENERATORS

USE LESS POWER... precision-built for efficiency and built-in voltage regulation.

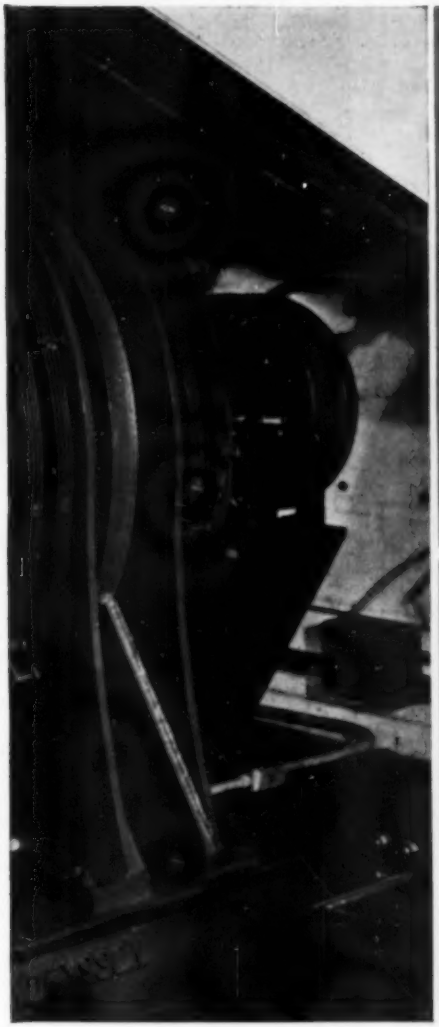
GET MORE OUT OF THE POWER YOU PAY FOR... built-in high power factor at no extra cost.

BE SURE OF POWER WHEN YOU NEED IT MOST... overload capacity as great as 50% momentarily and 25% sustained, without distress or damage.

ENJOY LIFETIME POWER DIVIDENDS... sustained, lifetime overall constant efficiency as high as 85% does not decrease with age or overload.

CHANDEYSSON ELECTRIC COMPANY, 4078 Bingham Avenue, St. Louis 16, Mo.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 609.



INDUSTRY LEADERS CHOOSE Chandeysson ELECTROLYTIC GENERATORS

Example:

At SUNBEAM CORP.'s Plant No. 2, CHICAGO,

these two 10,000 ampere, 9 volt, 40° Chandeysson Motor Generators provide ample, low-cost power for the plating and finishing of parts

HIGH-EFFICIENCY OPERATION IS ASSURED by the use of superior materials and craftsmanship. Chandeysson Generators have set the highest standards for performance, trouble-free operation and long life.

For complete information send coupon for bulletins D-101 and D-102

CHANDEYSSON ELECTRIC COMPANY
4078 Bingham Avenue, St. Louis 16, Mo.

Please send bulletins D-101 and D-102

Name .....

Company .....

Address .....

City ..... *Zone* ..... *State* .....

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 610.

Industry News

757th machine—one of the new heavy-duty Stevadoers—has already been engineered for such an installation.

"Of course the Stevens Full Automatic Barrel Equipment has for years had automatic load and unload features which made it one of the earlier pioneers in automation and accounts for its wide acceptance."

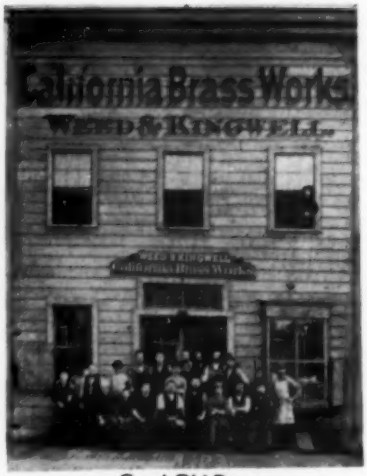
One Hundred Years Young. From ship's bells to vital bronze parts which are used by the aircraft industry—in a span of a century . . . such is the history of Kingwell Bros. Ltd., San Francisco, celebrating their 100th birthday next month.

This foundry is the largest of its kind in the west and one of the three largest in the United States. They make bronze bushings, the small piece of metal able to carry a heavy load in large machinery.

The original Kingwell Brothers, Ltd. foundry was located at 444 Natoma Street, not far from its present location at 457 Minna Street.

It was down on narrow, busy Natoma Street that Weed & Kingwell or California Brass Works made the padlocks for Wells Fargo money boxes, as well as fog bells for ships which moved in and out of the Golden Gate with their passengers, the venturesome miners. Bronze nozzles for the City's fire department were also made at the foundry.

Brass items were costly in those days. Jack Nauman, present president and part owner (there are also a small group of stockholders) has two receipts for material delivered in 1865, ten years after the company's founding. One receipt acknowledges $4.00 for 40 carpet buttons and another charged 10 cents a piece for some 36 brass rivets.



Good Old Days

The old bills carry this notation—"All bills payable in U. S. Gold or Silver Coin." Not only that, the old bills have a notation mentioning all the services the California Brass Works could perform. In addition to ship's bells, fire nozzles and safe box locks—"all kinds of Steam, Liquor, Water, Oil, Flange Cocks and Valves made and repaired."

The swing from the days of the horse and buggy and the Wells Fargo Express has been gradual and yet, in its way, sudden. Kingwell Brothers are no longer making ships bells or padlocks for gold filled boxes that rode beside the driver on the express.

Now the company does a large business with the aircraft industry, providing special parts with bronze bases for airplane components where strength and heavy duty is required. The list of heavy machinery manufacturers in the west are almost all Kingwell customers.

As Jack Nauman states it "Anything that carries a heavy load at a medium or slow speed requires a bronze bushing or bearing. We are still in the business supplying those bronze bushings."

In addition to Jack Nauman, other company officials are: Jack Starks, Sales Manager; Joseph Spediacci, Plant Superin-

Kingwell Today

First choice for finishing intricately shaped parts —

TIN-NICKEL

— the corrosion-resisting, non-tarnishing deposit

Note uniform deposition of tin-nickel inside tube that shows effectiveness of throwing power even into deep recesses. This ½" x 10" length of copper tube was plated vertically without an internal anode in an M&T TIN-NICKEL bath, then bisected longitudinally.

M&T's new tin-nickel plating process reaches hard-to-get-at areas with its excellent throwing power, making it ideal for finishing parts with deep recesses. But you will like it for these other reasons too: Outstanding corrosion resistance . . . excellent resistance to tarnishing . . . easy to color-buff . . . thin deposits plate bright on bright surfaces . . . readily solderable . . . hardness and wear resistance between that of nickel and chromium . . . moderate ductility . . . non-magnetic deposits.

It performs well too: easy to control . . . adapts well to still, automatic, or barrel plating . . . can be used with most base metals including steel, cast iron, copper, reflowed tin, brass, and bronze. It'll pay you to find out more — write or call us.

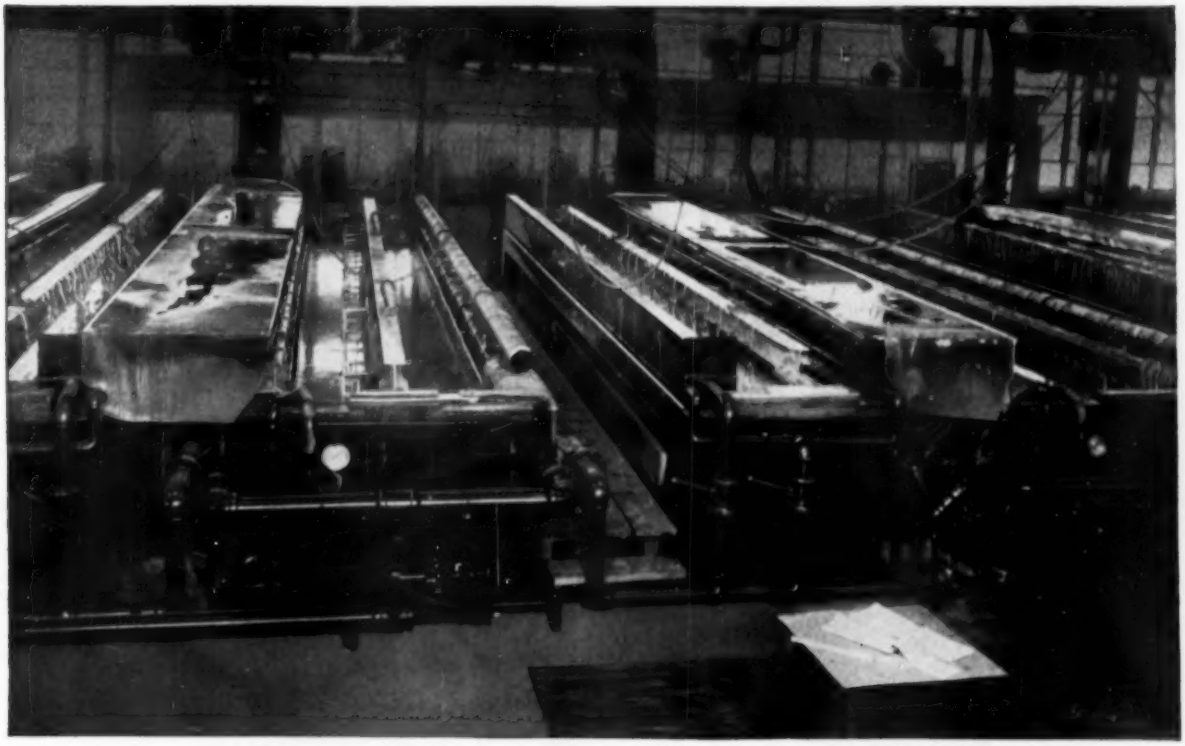
Tin-nickel plating will be demonstrated by M&T at the Industrial Finishing Exposition—June 20-23—Booth 332

METAL & THERMIT CORPORATION
Chemical Division
100 EAST 42nd STREET, NEW YORK 17, N. Y.

WHERE HAVEG EQUIPMENT IS INSTALLED

TRADE MARK REG. U. S. PAT. OFF.

PICKLING, PLATING, DEGREASING TANKS • BASKETS • PIPING • VALVES
AGITATORS • PUMPS • FUME DUCT • BIFURCATORS • HOODS



A typical large Haveg pickling tank installation.

Metal Finishing Corrosion has been Controlled!

All Haveg equipment has extra long life, extreme resistance to corrosive chemicals, and can be used continuously in a high range of process temperatures with complete safety and a proven history of performance.

Because Haveg corrosion-resistant tanks prevent specking or flaking of the finished product, the number of rejects is reduced and the plating job is uniform. Solutions do not build up on Haveg, thereby clean-up time is reduced.

Molded Haveg tanks are made in a single piece construction. Any size, style, baffle arrangement can be supplied to fit your process. Equipment is virtually tailor-made for longer service life, improved production.

ATLANTA, Exchange 3821 • CHICAGO 11, Delaware 7-6088
CINCINNATI 36, Sycamore 2600 • CLEVELAND 20, Washington 1-8700
DETROIT 39 Kenwood 1-1765 • HOUSTON 4, Jackson 6840
LOS ANGELES 14, Mutual 1105 • SEATTLE 7, Hemlock 1351
WESTFIELD, N. J., Westfield 2-7383

Remember, Haveg is not a coating or tank lining. It is a moldable rigid plastic material, made from acid-digested asbestos and synthetic resins specially selected for difficult service with practically all acids and salts, chlorine, many solvents. Throughout its entire mass, Haveg is resistant to practically all solutions used for finishing metals. Its long life is not a claim, but a fact proven in hundreds of installations.

Haveg can help you make your finishing operations more profitable and less subject to the waste of corrosion. Call the sales engineer listed and write for 64-page Bulletin F-6 which shows tank sizes, shapes, chemical ratings . . . the complete Haveg story.

HAVEG CORPORATION
NEWARK 6, DELAWARE

TRADE MARK REG. U. S. PAT. OFF.

FACTORY: WILMINGTON 8, DEL. • Wilmington 3-8884

A SUBSIDIARY OF CONTINENTAL-DIAMOND FIBRE CO.

Chromic Acid production in commercial quantities followed the development in 1926 of a practical process for chromium plating. Originally employed almost entirely for that purpose, Chromic Acid's use has not only expanded in the metal industry but has also proved valuable in many chemical reactions unrelated to plating or metal surface cleaning.

Mutual is keeping abreast of these expanded applications and today supplies a technical grade of Chromic Acid, assaying at 99.75% or better, to an ever-widening list of customers.

Chromic Acid is but one of the chemicals of chromium made by Mutual, specialists in their production for over 100 years. Other Mutual products include Sodium Bichromate, Sodium Chromate, Potassium Bichromate, and Ammonium Bichromate.

MUTUAL

MUTUAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

99 PARK AVENUE • NEW YORK 16, N. Y.

Allied Chemical

Relative

		Aluminum	Durimet 20	Hastelloy
20% Hydro-Chloric Acid	COLD		●	
	HOT	●		▲
10% Nitric Acid	COLD		●	
Vapors			●	
20% Hydro-fluoric Acid	COLD		●	
	HOT	●		▲
30% Tannic Acid	COLD		▲	
100% Dry Chlorine			●	□
20% Aerated Sulfuric Acid	COLD		●	
	HOT	●		▲
pH-7 Water (75° F.)			□	□
20% Aqueous Ammonia Liquid			●	□
20% Chromic Acid	COLD		●	
	HOT	●		▲
Kraft Liquor			●	
Sulfite Liquor			▲	
20% Aerated Phosphoric Acid	COLD		●	
	HOT	●		▲
Wet Sulfur Dioxide			▲	
20% Copper Chloride	COLD		●	
20% Aerated Acetic Acid	COLD		□	
	HOT	▲		□
20% Ferric Chloride	COLD		●	
30% Trisodium Phosphate	COLD		●	
20% Aerated Sodium Hydroxide	COLD		●	
	HOT	●		▲
Methyl Ethyl Alcohol	COLD		□	□

from technical data . . .

. . . to completed installation

Atlas can solve

your corrosion problems

•

Atlas manufactures a complete line of materials for corrosion protection in the plating industry . . .

- FLOORS
- PIT & SUMP LININGS
- PLATING TANK LININGS
- PLATING TANKS
- DIP BASKETS
- HOODS & FUME EXHAUST DUCTWORK
- PROTECTIVE COATINGS
- PLASTIC PIPE
- WASTE LINES

The most complete line of corrosion-proof materials of construction available from any one manufacturer. The highest quality materials manufactured by an experienced company is yours when you specify Atlas for corrosion protection.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

Yours without obligation. Send for your personal copy of the table shown opposite. Write directly to Atlas, and request "THE PLATING TABLE".

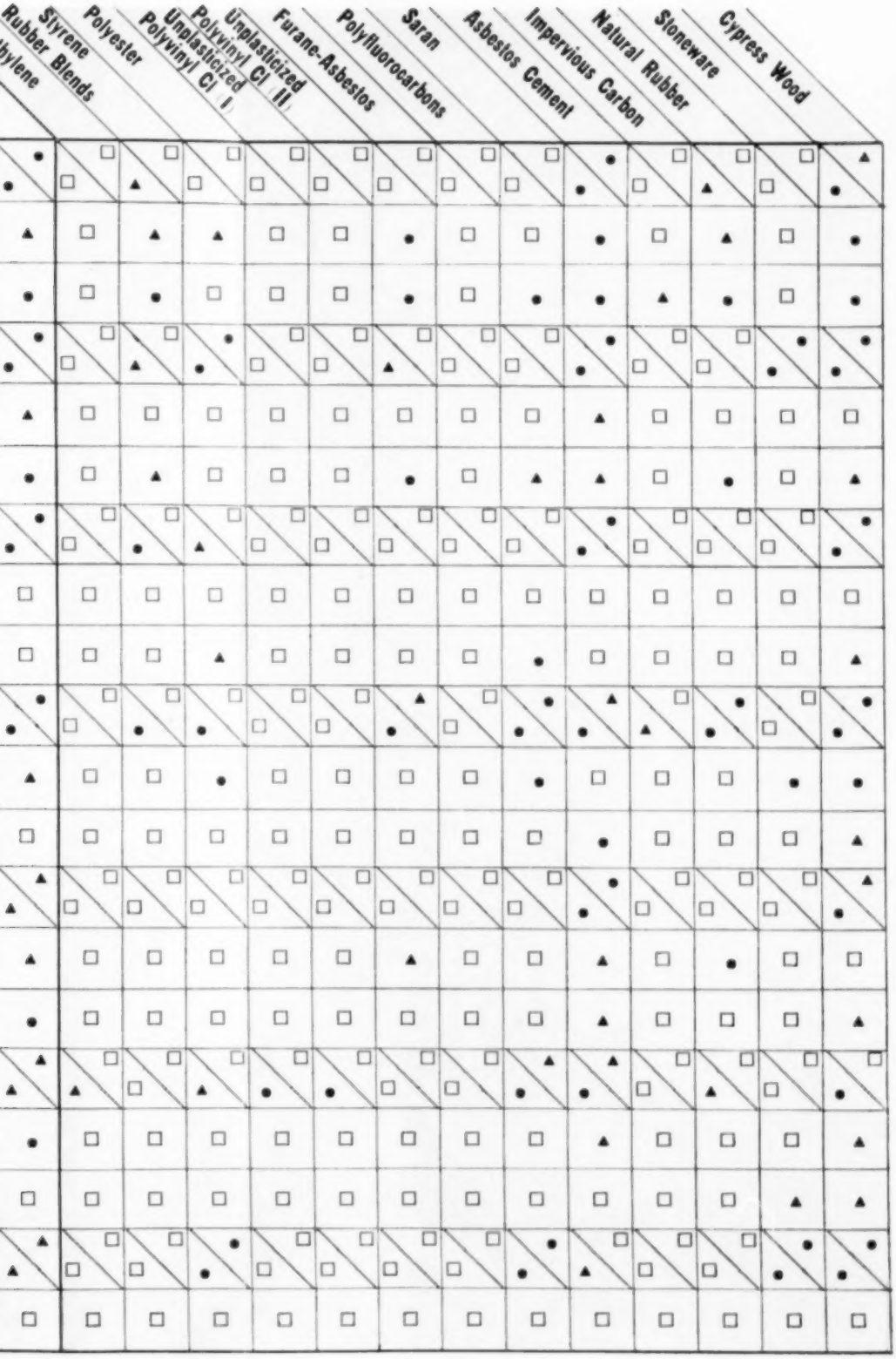
Relative Corrosion Resistance of Materi

		Aluminum	Durimet 20	Hastelloy	Lead	Monel	Nickel	N. Resist.	18-8 Stainless	Steel	Steel (17 Cr)	Polyethylene	Rubber
20% Hydro-Chloric Acid	COLD	●	□	▲	●	●	▲	▲	●	●	●	●
	HOT	●	▲	▲	●	●	●	●	●	●	●	●
10% Nitric Acid	COLD	●	▲	▲	●	●	●	●	□	●	▲
Vapors		●	●	●	●	●	●	●	●	●	●
20% Hydro-fluoric Acid	COLD	●	▲	▲	▲	▲	▲	▲	●	●	●
	HOT	●	▲	▲	▲	▲	▲	●	●	●	●
30% Tannic Acid	COLD	▲	▲	▲	●	▲	▲	▲	▲	▲	▲
100% Dry Chlorine		●	□	▲	▲	▲	▲	●	▲	□	●
20% Aerated Sulfuric Acid	COLD	●	□	□	□	●	●	▲	●	●	●
	HOT	●	▲	▲	□	●	●	●	●	●	●
pH-7 Water (75° F.)		□	□	□	□	□	□	□	□	●	□
20% Aqueous Ammonia Liquid		●	□	□	●	●	●	□	□	□	□
20% Chromic Acid	COLD	●	▲	▲	▲	●	●	●	●	▲	●
	HOT	●	▲	▲	▲	●	●	●	●	●	●
Kraft Liquor		●	▲	□	●	□	□	□	□	□	▲
Sulfite Liquor		▲	▲	●	▲	●	●	□	□	□	□
20% Aerated Phosphoric Acid	COLD	●	▲	▲	▲	▲	●	●	▲	●	▲
	HOT	●	▲	▲	▲	●	●	●	▲	●	▲
Wet Sulfur Dioxide		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
20% Copper Chloride	COLD	●	▲	▲	●	●	●	●	●	●	●
20% Aerated Acetic Acid	COLD	□	□	□	●	▲	●	●	□	●	●
	HOT	▲	□	▲	●	●	●	●	▲	●	▲
20% Ferric Chloride	COLD	●	▲	▲	●	●	●	●	●	●	●
30% Trisodium Phosphate	COLD	●	▲	□	●	▲	▲	▲	□	□	□
20% Aerated Sodium Hydroxide	COLD	●	▲	□	●	□	□	□	□	□	▲
	HOT	●	▲	□	●	□	□	□	□	□	▲
Methyl Ethyl Alcohol	COLD	□	□	□	▲	□	□	□	□	▲	□

□ Unattacked ▲ Questionable (shou

Prepared especially for PLATING magazine and used

terials of Construction to Various Chemicals



should be tested) • Not Recommended

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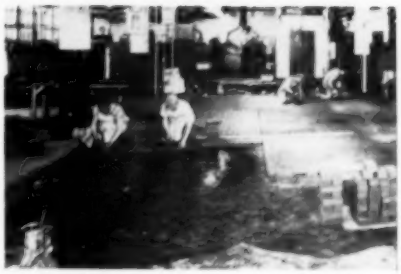
Atlas can solve your corrosion problems

tanks and tank linings...floors...pit and sump linings...coatings...hoods and fume exhaust ductwork...dip baskets...plastic pipe...waste lines...

Atlas has over a quarter century of experience in protecting the plating industry from corrosion. Atlas' complete line of corrosion-proof cements, coatings, linings and rigid plastics have been employed to protect all parts of the plating shop from waste lines to fume exhaust stacks. The entire Atlas Engineering and Technical Staff is at your service to recommend a solution to any corrosion problem that may confront you.



Atlas Industrial Floor being installed in the plating room of a large electrical manufacturer. Floor is subject to strong acids, alkalies, solvents and oils.

PLATING ROOM FLOORS

ATLAS INDUSTRIAL FLOORS are designed for lasting durable service. Constructed of Atlas ALKOR® (mortar cement) or VITROBOND® (hot pour cement) depending on conditions involved. Atlas Industrial Floors resist acids, alkalies, solvents and detergents. Atlas materials have been used in the construction of millions of square feet of flooring in every industry where corrosion exists.

PLATING TANK LININGS

PLATING TANKS are completely protected by ATLAS CORROSION-PROOF LININGS. Sheet linings are installed in steel shells by Atlas trained technicians for most conditions with Atlas brick sheathing available where excess abrasion or high temperatures are involved. Concrete shells are protected with Atlas ATLANTISEAL, corrosion-proof lining.

HOODS AND FUME EXHAUST DUCTWORK

FUMES are carried away efficiently by Atlas AMPCOFLEX constructed hoods and fume exhaust ductwork. Entire exhaust systems, from simple risers to large stacks, are fabricated solely from AMPCOFLEX using the hot air welding method. With AMPCOFLEX systems, there is no coating to wear thin with time, because the entire thickness of the system consists of the same corrosion-proof material.

PLASTIC PIPE

TO CONVEY solutions to and away from plating tanks, Atlas PEE VEE CEE® pipe is used. Resistant to impact and corrosives, complete pipe systems can be constructed from this extruded rigid polyvinyl chloride pipe. Fittings and other parts made of the same material are available from stock.

PIT AND SUMP LININGS

LININGS for pits and sumps ranging from heavy duty Atlas coatings to Atlas ATLASTIC® 31 impervious membrane protected by Atlas cement joined brick. Atlas linings are immune to attack of plating solutions and will serve long and well.

PLATING TANKS . . . DIP BASKETS

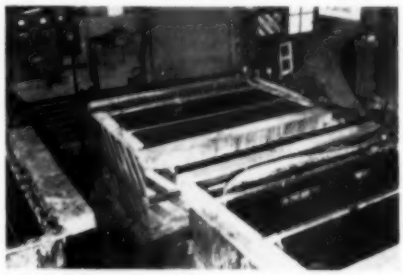
FABRICATED to meet your specifications, complete self supporting plating tanks and dip baskets are produced in AMPCOFLEX®. This rigid polyvinyl chloride resists corrosion of a wide range of plating solutions (see chart, opposite page). This corrosion-proof plastic has wide application in many phases of plating operations.

PROTECTIVE COATINGS

TANK EXTERIORS, WALLS, CEILINGS AND BEAMS are protected from splash and fumes of plating solutions by Atlas PROTECTIVE COATINGS. General purpose, heavy duty and high chemical resistant coatings are available depending on conditions involved. Let Atlas corrosion engineers recommend the correct coating for your specific conditions.

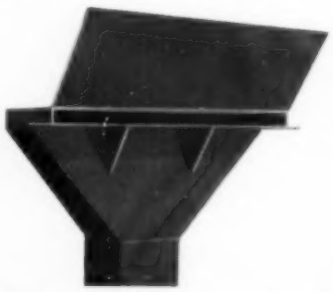
WASTE LINES

WASTE LINES are installed using the jointing material most suited to the conditions involved. Atlas JC-60® or Atlas combination joints for vitrified clay pipe fill the need for a highly adhesive, chemically resistant pipe joint.



Cyanide copper plating tank. Interior is lined with Atlas Corrosion-Proof Lining and exterior is protected by Atlas Protective Coating.

Application of Atlas Protective Coating on beams and ceiling to insure long lasting service even in the presence of strong acid fumes.



Baffle type slotted hood section to be used for exhausting fumes from plating bath. Unit is the "Push-Pull" type of system where a jet of air is passed across top of tank.

Request your copy of Catalog P-1, a 50 page file of bulletins on Atlas corrosion-proof materials of construction for use in the Plating Industry.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

The 110,000 square foot modern manufacturing plant above is the new home of J. Holland & Sons, Inc. It was built to serve you better.

- **WE OFFER YOU** an extensive and varied stock of finishing products *on the floor.*
- **WE OFFER YOU** immediate delivery.
- **WE OFFER YOU** the technical and engineering help you may need for your *individual* problems.
- **WE OFFER YOU** the most modern, streamlined operation in the industry; all your finishing needs from a single source; efficient service; superb quality; fair prices; *even free parking in our adjoining lot!*

Why not visit us soon and see for yourself the finest in:

POLISHING	PLATING	SPRAY PAINTING
Polishing Machines	Rectifiers	Spraying Machines
Grinding & Strapping Equipment	Generators	Baking Ovens
Tumbling Barrels	Plating Units	Spray Booths
Exhaust Systems	Coils	Dryers

. . . and over a thousand other products comprising one of the largest stocks in the metal finishing industry.

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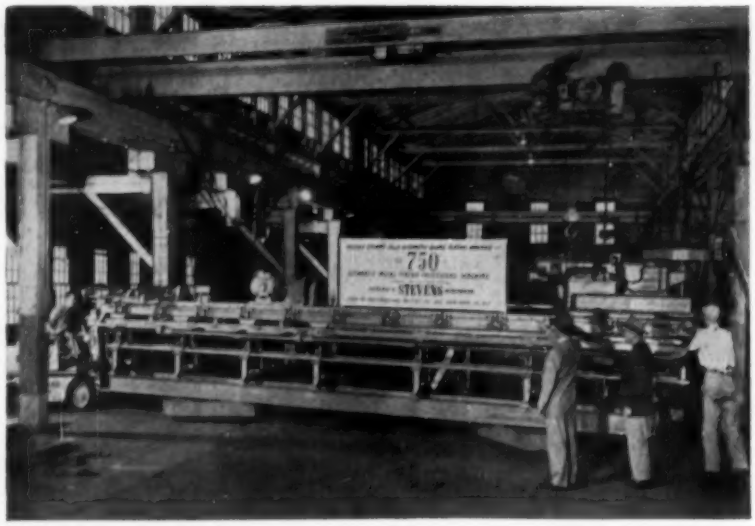
LEADERS IN FINISHING EQUIPMENT FOR OVER A HALF-CENTURY

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 614.

Industry News

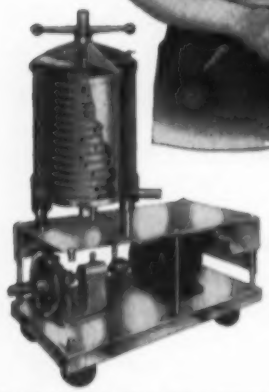
tendent; and Sidney Rudd, Treasurer, and at the present time 100 skilled workmen turn out the intricate bronze bushings with the same care which their predecessors did 100 years ago.

Kingwell Bros. Ltd. is joined by three other San Francisco companies in celebrating their one hundredth anniversary this year. Blake, Moffitt & Towne, a paper company, The San Francisco Call Bulletin, and Parrot & Co., a brokerage and insurance firm.



The framework of Stevens 750th Automatic Processing Machine being readied for shipment from Stevens Springfield, Ohio plant. L. to r.: Charles Mitchell, General Manager of Stevens Mitchell Engineering Division, and David Heironimus, Plant Manager

guard against Rejects



"Sealed-Disc" Filters were designed especially for plating rooms. They're smaller, compact, and more portable than ordinary conventional Filters, and they are also performing satisfactory results on many acid dips, electro cleaners and solvents.

You can be sure with a "Sealed-Disc" Filter

More and more cost-minded platers depend on Alsop "*Sealed-Disc*" Filters to remove dirt, dust, and sludge from their plating solutions. They get better finished plated work, they save time and labor, and their plating solutions last longer. The "*Sealed-Disc*" Filter assures positive, trouble-free performance that's proof against even the invisible impurities that cause nodules and porousness, proof against rejects and reworking. There's a "*Sealed-Disc*" Filter "*to fit your job*"—write for complete information, the Alsop Engineering Corporation, 1006 Fine Street, Milldale, Connecticut.

ALSOP ENGINEERING CORPORATION

Filters, Filter Discs, Pumps, Tanks, Mixers, Agitators

Union Carbide Lab to Seek Materials of Tomorrow. Union Carbide and Carbon Corp is building new Research Laboratories at Parma, Ohio, a southwesterly suburb of Cleveland, to be managed by National Carbon Company, a division of the Corporation.

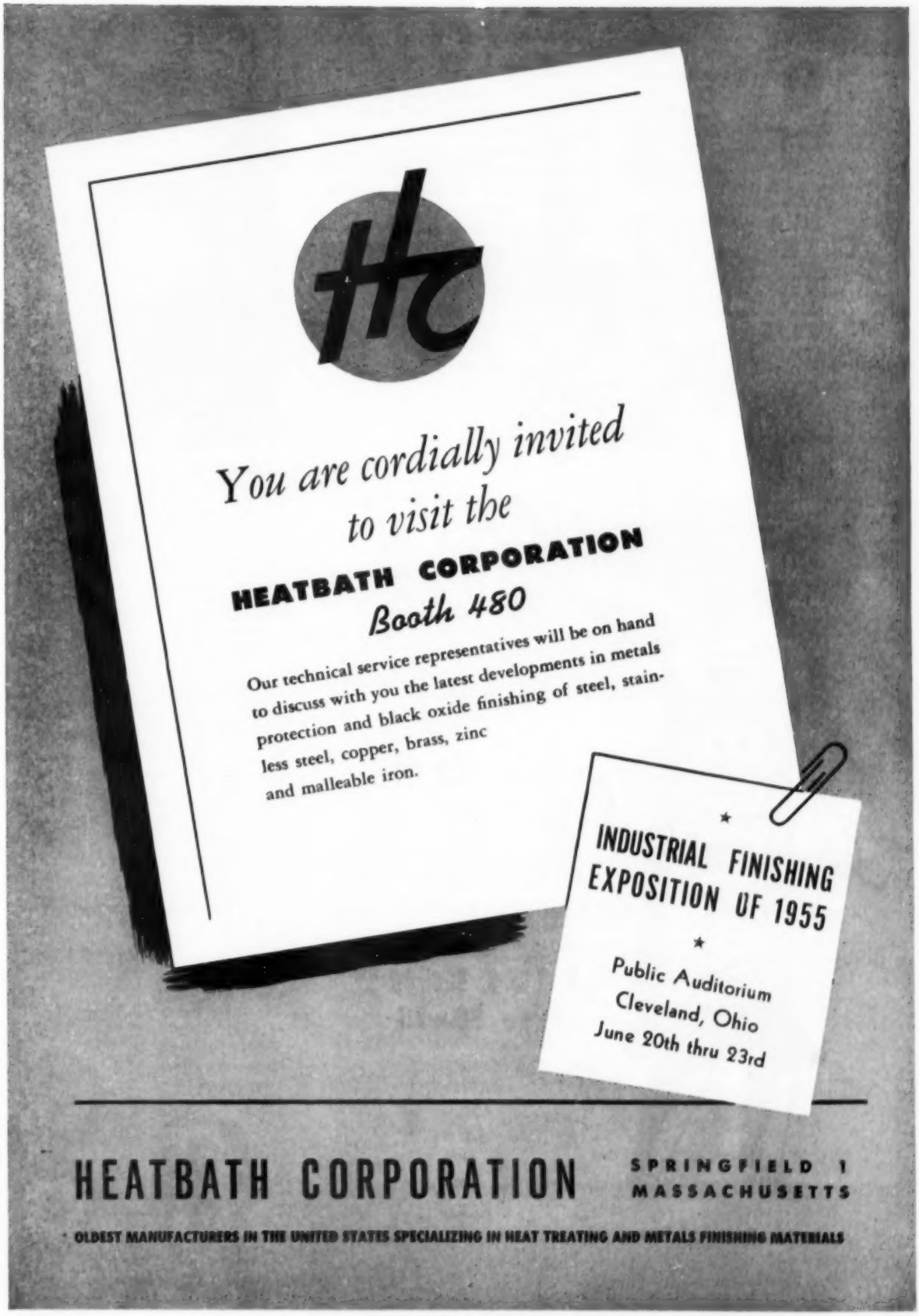
The new Research Laboratories will engage in basic, exploratory work. Much of the work in the new laboratory will be on solid state physics research in the broad abstract sense as well as the practical investigation and design of materials to meet future requirements of industry. Work will be done with metallic and nonmetallic compounds of carbon, as well as analogous compounds such as intermetallics and semiconductors.

Research activities will be directed toward specific end-products only to the extent that such products have their primary origins in the discovery of new and fundamental material-process applications. On this broad basis, the horizons of this new research operation are virtually unlimited and, consequently, unpredictable.

The key to further development of new "ferrites" may be found. Ferrites are complex inorganic compounds having high permeability at low flux—they could have wide application in electronic computers and automation devices.

New refractory compounds, as well as improvements in the established materials such as graphite, could come out of research on totally new materials and processes for this important industrial application.

Plant of Tomorrow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You are cordially invited
to visit the
HEATBATH CORPORATION
Booth 480
Our technical service representatives will be on hand to discuss with you the latest developments in metals protection and black oxide finishing of steel, stainless steel, copper, brass, zinc and malleable iron.
INDUSTRIAL FINISHING EXPOSITION OF 1955
Public Auditorium
Cleveland, Ohio
June 20th thru 23rd
HEATBATH CORPORATION
SPRINGFIELD 1
MASSACHUSETTS
OLDEST MANUFACTURERS IN THE UNITED STATES SPECIALIZING IN HEAT TREATING AND METALS FINISHING MATERIALS

Industry News

Chemical Products Corporation Launches Plant Expansion Program. In a move designed to double their plant area, Chemical Products Corporation of East Providence, R. I., has broken ground for a multi-storied addition.

William J. McGowan, President, stated that the new building is part of the company's long-range development plans, laid many years ago. These plans not only included growth in sales and personnel but in the physical apparatus of the organization.

Included in the new $500,000 building will be greatly enlarged facilities for the manufacture of the well-known plastisol formulation, Chem-O-Sol. There will also be an extensive expansion of the laboratory and research departments to continue the development of new uses for Chem-O-Sol. Chem-O-Sol is already being used in many fields to improve on old products and to create new ones. Coating glass fibres to be woven into screening, waterproofing automobile lamp sockets, spraying on barrel interiors—are only a few of the many uses of this versatile basic material. It is expected that the new research facilities will greatly expand the field for new applications of Chem-O-Sol.

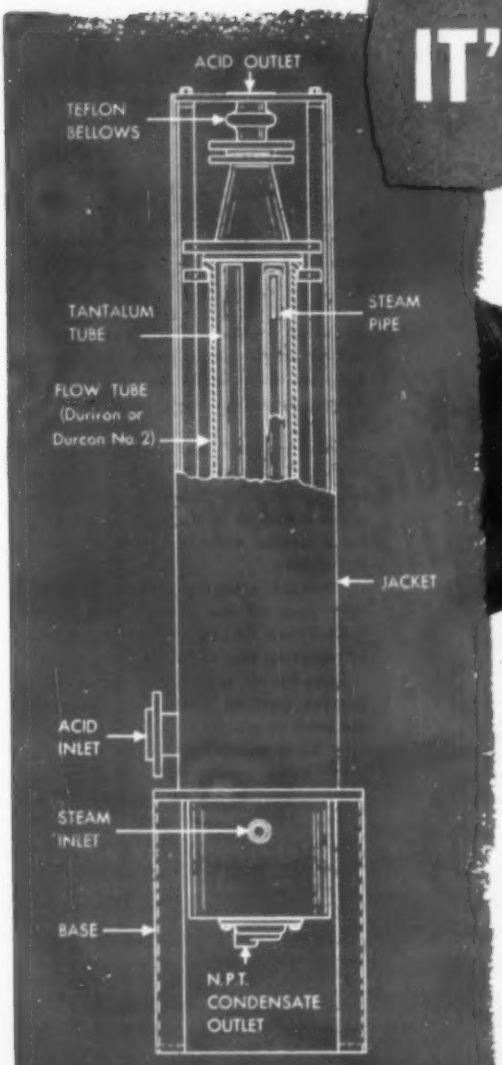
Direct Factory Representatives. The Parker Machine Company manufacturers of Parker-Matic, the automatic polishing and buffing machinery, have appointed Maplewood Companies as direct factory representatives. The latter are located at Maplewood, N. J.

Congratulations were in order when the 9 millionth Maytag washer came off the assembly lines at the company's automatic washer and dryer plant in March. (March 22). Above, Fred Maytag II, left, president of The Maytag Company, at Newton, Iowa, expresses appreciation to L. C. McAnly, Sr., manager of Maytag manufacturing, on the achievement of the company's recent production milestone. The celebrated washer and matching dryer are shown on an attractive platform at rear. The 9 millionth washer was identified with a colored banner and by gold frit letters baked into the enameled top panel. Twenty-four carat gold plated metal trim further identified the machine. The washer and matching dryer were awarded Morris Trout, employe-stockholder, during the annual stockholders' meeting held in the afternoon. His name was drawn from the drum of a Maytag dryer following the annual meeting. The One Millionth Maytag washer was produced in 1927

Our industry regrets the passing of John M. Cook, Executive of Behr-Manning Division of Norton Company who died April 14

Cook

Get maximum
heat transfer efficiency



IT'S NEW

THE DURCO TANTALUM TUBE
Heat Exchanger Unit

- **Maximum Corrosion Resistance**
- **Low Pressure Drop**
- **Maximum Heat Transfer**
- **Integral Steam Trap**
- **High Flow Rate**
- **Minimum Floor Area**

The all new DURCO heat exchangers are available as single or double tube units. Flow tubes are of Duriron and are available in Durcon No. 2* for high chloride and chrome plating solutions. Heating tubes are Tantalum. Integral steam trap assures continuous removal of steam condensate. Complete units include Series H DURCOPUMPS and Durco valves. These are available in Duriron, Durimet 20, or Durcon No. 2.*

**Durcon No. 2 is the new epoxy base resin as manufactured by The Duriron Company, Inc.*

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

THE DURIRON COMPANY, INC., DAYTON, OHIO

BRANCH OFFICES: Atlanta, Boston, Buffalo, Chicago, Cleveland, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia, Pittsburgh

Industry News

Zr and Hf Cheaper. Prices on zirconium metal for nuclear reactors and for the chemical industries have been reduced up to 40 per cent, according to an announcement by Mr. Niles C. Bartholomew, Vice President and General Manager of The Carborundum Metals Company, Inc., Akron, New York.

Under the announced price reduction, commercial grade zirconium ingots 500 lbs. and over are $14.40 per pound, compared with the previous price of $22.00 per pound. Similar reductions are made in the low hafnium grade metal. Reactor grade sponge, formerly $22.00 per pound, will be sold as low as $14.00 per pound. The low hafnium ingot, now $23.07 per pound in 500 lb. quantities, was previously priced at $33.00 per pound.

Carborundum Metals, the world's only commercial producer of low hafnium zirconium, went into production just two years ago. Bartholomew stated that the drastic price reduction announced here, after such a short period of operation, has been made possible by, "our ability to reduce the cost of basic metal, the selection of well qualified fabricators and particularly, the ability of these fabricators to increase their yields of acceptable, on specification, material." Among the principal fabricators of zirconium metal cooperating with Carborundum Metals to achieve these significant cost improvements are: Firth Sterling, Inc.; Superior Tube Company; Allegheny Ludlum Steel Corporation; Bridgeport Brass Company; Chase Brass & Copper Co., Incorporated; and Simonds Saw and Steel Co.

meet a famous cost cutter!

• Well known from coast to coast, Unichrome Coating 218X is identified by the flexible, thick, pore-free and chemical resistant protection it puts on racks in one coat . . . protection that has minimized rack maintenance costs for its users.

This green plastisol compound cures into a tough coating that doesn't chip, crack, lift at contacts, blister . . . that won't contaminate sensitive baths, that withstands all plating and cleaning solutions, even vapor degreasing cycles. Its premium quality is undisputed, its adhesion outstanding.

Remember . . . as a company that has developed plating processes, given service on plating problems, pioneered in plastisol coatings, United Chromium can deliver exactly what a rack coating needs for maximum service in your plant.

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Engineering Scholarship to Carnegie Tech Offered. A four-year, tuition-paid scholarship to study electrical or mechanical engineering at Carnegie Institute of Technology is being offered by the Robertshaw Research Center, Robertshaw-Fulton Controls Company.

The scholarship, which has an estimated value of $2,820 plus a $100 cash prize for the winner, will be awarded to an outstanding high school senior from Westmoreland County, Pa. Honorable mention prizes—U. S. Savings Bonds—will be presented to two students placing second and third in the competition.

In addition to the scholarship, Carnegie Tech will receive $500 for each year the winner is at the school.

Winner of the scholarship will be selected by the Scholarship Award Committee of Carnegie Tech. The winner is not required to enter the employ of Robertshaw-Fulton after he completes his course at Carnegie Tech, the company announced.

The scholarship, like those awarded by other divisions of Robertshaw-Fulton Controls Company, is intended as a "no-strings-attached" contribution to the engineering profession "at a time when the nation needs more young engineers to keep its world leadership in technology," a company official said.

"Teamwork" in Finishing. A special brand of "teamwork" between finishing compounds and finishing procedures is given credit by a Michigan manufacturer for achieving what it calls a "new future in finishing."

"Specific compounds are teamed up with each of our finishing procedures," Roto-Finish Co., of Kalamazoo, explained in reporting how its processes operate.

Roto-Finish compounds, a "very important part of Roto-Finish processes," are used in general to produce the necessary lubrication for the chip mass and parts being processed.

New compounds developed by Roto-Finish prevent tarnishing, etching and rusting of parts being processed and yet maintain cleanliness in the compartment and chip mass.

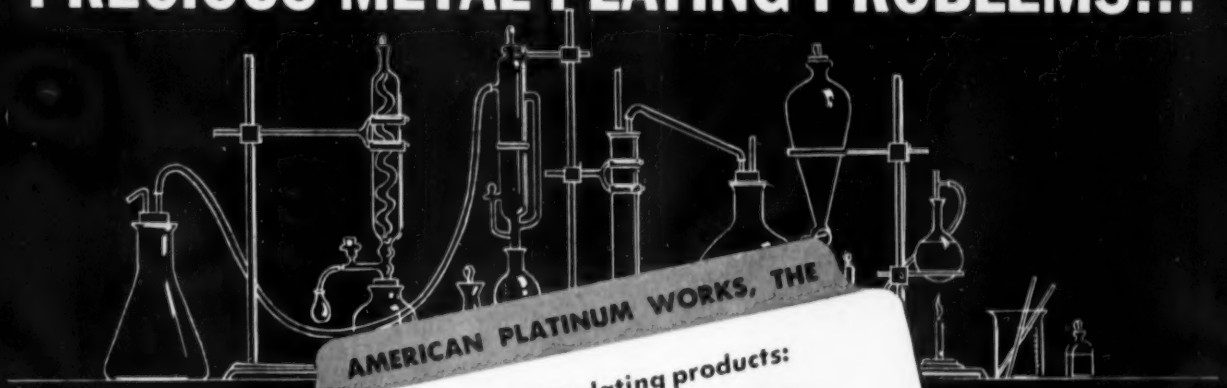
In certain instances, it was explained, compounds provide abrasive necessary to produce the desired result.

Functions of compounds are many and varied, it was reported. They prevent chips from becoming glazed or loaded with fine metal particles removed from parts being deburred or finished.

Grinding compounds, for example, contain water softeners to handle water hardness factors.

Roto-Finish Britehoning process compound provides a material which causes coating to form on chips. The resulting coating is necessary in securing proper results as it allows the chip mass to act as a honing medium rather than a grinding or polishing mass.

TO HELP SOLVE YOUR PRECIOUS METAL PLATING PROBLEMS...



AMERICAN PLATINUM WORKS, THE

A partial list of APW plating products:

A.A. SILVER ANODES
POTASSIUM SILVER CYANIDE
SILVER CYANIDE
C.P. SILVER NITRATE

Meets A.C.S. Specifications

Our Research Staff develop the anodes and the precious metal salts plating materials you need for best results. The valuable experience and facilities of our Electro-chemical Research Division are at your service, to help minimize your costs or improve efficiency in your plating procedures.

We think of both as equally important services and APW welcomes requests for either one or for both. No charge for the technical service—we just want to be sure you use it—*freely*.

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THE AMERICAN PLATINUM WORKS

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SINGLE-KNOB CONTROL provides easy finger-tip setting adjustments.

GENERAL ELECTRIC ANNOUNCES

NEW Germanium Plater That Will Save You Money in Your Plating Operation

Now General Electric brings over four years of germanium experience into the plating field with a new 1000-amp plater that will make possible big savings in your plating operation. Designer and builder of more germanium units than all its competitors combined, G.E. offers you "XB"—experience bonus—along with economy of operation.

YOU SAVE MONEY in installation, operating, and maintenance costs with these new G-E germanium rectifier plating power supplies.

Installation costs are lower, because these compact, lightweight rectifier units need no special foundations.

Operating costs are greatly reduced by germanium's high over-all conversion efficiency*—90 per cent even at 12 volts d-c.

Extremely low maintenance costs in germanium platers result from a minimum of moving parts, and an absence of aging in the germanium element.

NEW G-E GERMANIUM PLATING POWER SUPPLIES feature down-draft air cooling, single-knob finger-tip control, and complete control flexibility. In addition, these 1000-amp, 12-volt units have smooth, stepless control, and hermetically sealed rectifier cells for long life in corrosive plating room environment.

G.E.'s down-draft air cooling draws air in horizontally through the front panel minimizing dust and dirt intake.

Single-knob finger-tip control means not only simplified adjustment, but elimination of multi-knob fumbling and possible transformer unbalance, as well.

Complete control flexibility permits the addition of automatic control in the future without necessitating complete replacement of the manual control.

To date, over 5990 kilowatts of G-E germanium rectifier power supplies are in operation—the equivalent of 1,000,000 amperes at six volts, the normal plating voltage—with another 5080 kilowatts on order. G.E. offers you real germanium know-how based on experience.

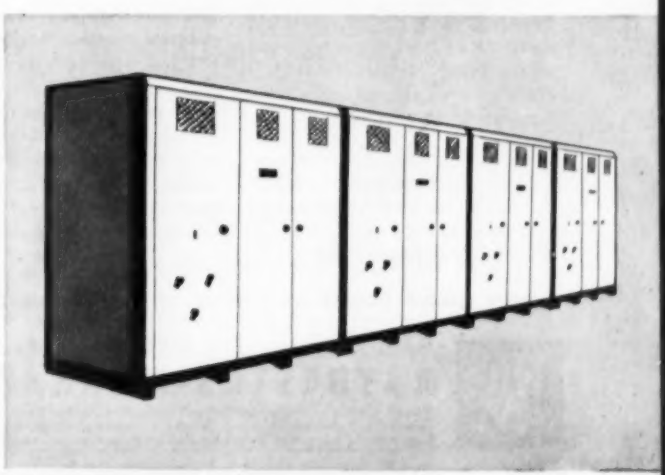
ADDITIONAL INFORMATION on G-E germanium plating power supplies is available from any authorized G-E plating agent, or by writing Section 463-12, General Electric Co., Schenectady 5, N. Y.

*Measured in accordance with recognized ASA, AIEE, and NEMA standards.

Progress Is Our Most Important Product

GENERAL ELECTRIC

EASE OF INSTALLATION, and the fact that only one side of the rectifier need be clear, helps eliminate layout problems.



"BIG BROTHER" of the new plating power supply, this germanium installation furnishes d-c power for anodizing operations.

Industry News

Seeking "Unknown Knowledge" is Aim of Research Scientists. America's industrial progress depends to a great extent on the procurement of knowledge that does not now exist, according to Dr. Daniel Alpert, of Pittsburgh, Pa., manager of the physics department of the Westinghouse Research Laboratories. He reported that a large portion of Westinghouse research activities is aimed at obtaining information that has nothing to do with the development of a special product or the commercial application of a process.

Speaking before the Providence, Rhode Island, Engineering Society, Dr. Alpert said that it takes about 10 years for an industry or the public to derive benefit "from the acquisition of a new piece of fundamental knowledge."

In outlining the three forms of research as regarded by Westinghouse—namely fundamental, basic and applied—the speaker declared:

"In the simplest terms, the emphasis in our fundamental research activity, which represents about 30 per cent of our total research effort, is placed on securing knowledge that does not now exist—knowledge about nature itself. This form of research is beamed at the development of no special product and does not contemplate any immediate commercial application."

Describing the basic phase of research operations, Dr. Alpert said it accounts for about 60 per cent of his company's total research activity.

"This, too," he explained," is devoted to the development of knowledge that does not now exist, but in this field—basic research—we know what we want before we start; we are working to satisfy a known need for improvement, and we know already how we will benefit if we can get the proper research answer."

Applied research, he said, is tied in with engineering development and is concerned with testing of suppliers' materials, studying new equipment and testing new designs.

Citing as an example of how research scientists today are "shooting in the dark," Dr. Alpert pointed out that in 1937 Westinghouse erected at its Research Laboratories in East Pittsburgh, Pa., the first industry-built atom smasher.

The fundamental reason for starting that project was to add to our field of knowledge in nuclear physics. No mention was made in 1937 and no thought was given then toward carrying our experiments to the point of securing useful energy from the nucleus. But, the practical results of that undertaking have been tremendous for it served as the groundwork for Westinghouse to build the world's first atomic engine for a submarine, the U. S. S. Nautilus, which began its sea trials last January. And of course these early studies were invaluable in the design of the nuclear reactor portion of the nation's first fullscale power plant at Shippingport, Pa. Westinghouse is constructing the reactor of the plant for the Atomic Energy Commission while the Duquesne Light Company is building the electric generating portion.

Indicative of the continuing need for a vast research program, the Westinghouse scientist said, is the multi-million dollar investment his company is making in a new, ultra-modern research center now nearing completion on the outskirts of Pittsburgh.

"In these new laboratories," he said, "we will be able to continue probing into the unknown and perhaps our results will be even more spectacular than the nuclear research operation. By no means are we approaching the peak of the curve of technical progress. Although we have cleverly utilized electrical energy, for example, we still know surprisingly little of just what it is and why it acts as it does. As we re-examine through research the fundamentals on which industry is built, the curve of progress will continue to rise."

Name Change. Alfred Sonntag, president, has announced that, effective April 13, the name of The Alpha Corporation was changed to The Alpha Molykote Corporation, Stamford, Conn.

This change in company name was made to reflect the primary activity of the company which is the development, manufacture and sale of industrial lubricants which have become known all over the world under the trade name "MOLYKOTE."

HOW TO BUY RUBBER LINING

FOR PERMANENT PROTECTION Against Corrosion and Contamination

Look for the company with the most advanced techniques and facilities for applying thick rubber lining to metal equipment of any size or shape.

Inferior rubber linings that crack or oxidize add to the cost of expensive equipment used in steel pickling and metal plating operations. In addition to corrosion of equipment, contamination of solutions can destroy the high quality of a finished product. Make certain the rubber tank linings you buy provide thick, inseparable protection for your equipment; eliminate stray plating currents and costly contamination in your process.

Specify the rubber linings proved to provide permanent, positive protection for your metal finishing operations . . . specify Manhattan Rubber Linings.

MANHATTAN RUBBER LININGS

Manhattan engineers have developed a method of bonding rubber to metal so securely that tests prove it can't be separated. Manhattan Rubber Linings are made from thick, calendered sheets of natural or synthetic rubber for maximum durability . . . they expand and contract with the metal under temperature changes without hardening or cracking. To further assure lifetime protection, every Manhattan rubber lined tank is tested under high voltage to detect any possible defect. Whether your equipment is simple or intricate, large or small, Manhattan facilities and rubber engineering craftsmanship insures the safe handling of your rubber lining project. Let an R/M lining engineer help you with your rubber lining or covering problems.

RUBBER LINING PLANTS AT PASSAIC, N. J. and NORTH CHARLESTON, S. C.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles Engineered Plastic, and Sintered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 623.

SISAL #544-RD

Churchill Finger-Buff*

Especially Developed for

FAST, RUGGED ACTION

on all

HEAVY DUTY OPERATIONS

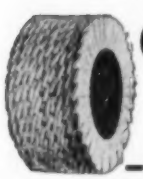
TWO NEW SPECIAL FEATURES

Improved construction of the new sisal type No. 544-RD Churchill Finger-buff* provides new, effective cutting action . . . particularly adapted to perform the heaviest of buffing operations.

Made from the same high quality, super-twisted sisal twine as other popular Churchill sisal wheels, construction of this No. 544-RD provides a wheel in which groups of the sisal twine contained in each finger are combined to form individual units which add strength and rigidity to each finger. In addition, extra sewing on each finger aids in the maintenance of each unit under severe usage.

Actual production tests on this wheel prove that the new construction greatly increases the life and cutting power of this extra heavy-duty Churchill Sisal wheel type No. 544-RD.

• Churchill Finger-Buffs* are competitively priced. Produced in all sizes from 6" to 18" diameters. For complete information write your problem.



Geo. R. Churchill Co., INC.

CHURCHILL FINGER BUFFS*

*Trade Mark Reg. U. S. Pat. Off.

Representatives in Principal Cities

FREE Catalog

Geo. R. Churchill Co., Inc., Hingham, Mass., Dept. P
Please send me FREE catalog and complete information.

•My special buffing problem is .....

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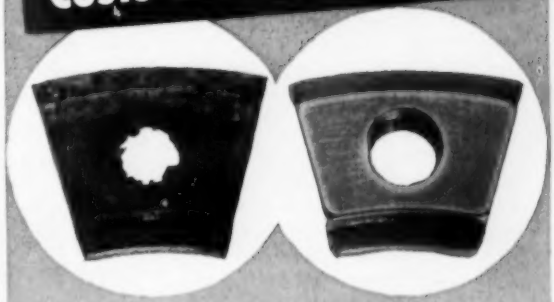
City ..... Zone .... State .....

JUNE 1955 USE READER SERVICE CARD; INDICATE A 624.

Hand Work Eliminated— and Finishing Costs Cut 99+%



BEFORE AFTER

By using Supersheen Speed Finishing a machinery manufacturer was able to reduce finishing costs 99.94%—or from $.054 to $.0003 per piece on the above part.

WHY WAIT LONGER TO CUT YOUR DEBURRING AND FINISHING COSTS?

Literally hundreds of case histories show almost unbelievable savings when Supersheen Speed Finishing supersedes older outdated methods. We will provide engineering and cost data from actual test runs under actual shop conditions of your parts at no cost or obligation to you. Send the coupon right away for details of this amazing Free finishing service.

ALMCO

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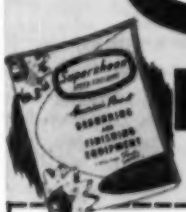
SPEED FINISHING

ALBERT LEA, MINN.



FREE Mail coupon for this big, new 52-page catalog of money-saving finishing facts, figures, "before and after" photos. Learn the latest on equipment, compounds.,

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Please rush me your new catalog "Supersheen Speed Finishing."

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USE READER SERVICE CARD; INDICATE A 625.

Personals

Charles B. Sanborn has joined the electroplating section of the development and research division of The International Nickel Company, Inc., in New York, according to an announcement by **O. B. J. Fraser,** assistant manager of the division. The electroplating section is principally concerned with the technical aspects of the applications and uses of nickel coatings.

Sanborn

Sanborn was formerly associated with Graham, Crowley & Associates, Inc., Chicago; Sherwin-Williams Company, Cleveland, and American Steel & Wire Company, Cleveland, where he was senior research chemist at the company's research laboratories.

Sanborn was graduated from Fenn College, Cleveland, in 1936 with a B.S. degree in chemical engineering. He is a member of the ACS, the AES and the Electrochemical Society, of which he is a past chairman of the Cleveland Section.

The appointment of **Eldon Johnson** as a member of the staff of the Barrymount Corporation was announced by **Sheldon E. Young,** manager. Barrymount Corporation is a subsidiary of Barry Controls Incorporated, manufacturers of shock and vibration isolation equipment.

Johnson

In his new position, Johnson will be engaged in the development of the industrial market in the Chicago area, Illinois, Wisconsin, Iowa and Indiana on behalf of Barry and its line of products for the industrial, electronic and packaging fields. He will devote particular attention to establishing effective distribution channels for the leveling Barrymount machinery mounts.

Prior to his association with Barrymount, Johnson was a staff consultant in the manufacturing field with McKinsey and Company, Management Consultants. Previously he was associated with the DuPont Company as industrial engineer. A graduate of Illinois Institute of Technology and the Massachusetts Institute of Technology, he is a member of the American Society for Quality Control and Western Society of Engineers.

William Giesker has been appointed superintendent of The Autoyre Company. Giesker has been associated with the company for eight years. He was employed as research engineer and more recently has been the company's chief chemist.

Giesker

Giesker is a graduate of Rensselaer Polytechnic Institute and holds a Bachelor of Chemical Engineering degree.

Sheller L. Steinwender has been appointed vice president of The Permutit Company, New York 36, N. Y., according to an announcement by **Henry W. Foulds,** president of the water conditioning firm.

Steinwender

Before joining The Permutit Company, Steinwender, a chemical engineer, was vice president of the Scaife Company in Pittsburgh, Pa. Prior to that, he was with the A. O. Smith Corporation and the American Cyanamid Company.

General Walter Bedell Smith has been named chairman of the board and president of AMF Atomics Inc., according to an announcement by **Morehead Patterson,** AMF board chairman and president.

Smith

AMF Atomics Inc., is a wholly-owned and newly-formed subsidiary of AMF which will carry forward the company's broadening activities in the atomic energy field and be responsible for AMF's atomic energy operations.

Arthur V. Peterson, formerly director of the Atomic Energy Department of AMF's Engineering Division, will be vice-president for operations of AMF Atomics Inc. Prior to coming with AMF in 1953, Peterson served for 11 years with the Atomic Energy Program and from 1947 through 1952 was in charge of the production of fissionable materials in AEC's division of production.

In addition to General Smith, the members of the board of AMF Atomics Inc., are: **George S. Hills,** member of the law firm of Rogers, Hoge & Hills and general counsel of AMF and its subsidiaries; **Murray McConnel,** president of Cuno Engineering Corporation; **Stanley deJ. Osborne,** executive vice-president of Olin Mathieson Chemical Corporation: **Eugene Zuckert,** atomic energy consultant and formerly a member of the Atomic Energy Commission.

The atomic energy activities of AMF, which began with the inception of the Manhattan Engineer District in World War II, have increased sharply during the past year.

The Frederick Gumm Chemical Company of Kearny, N. J., manufacturers of CLEPO Compounds, announce the appointment of Robert E. Moore, as their Eastern New York State representative, with headquarters in Syracuse, N. Y. Moore is very well equipped to service his products, having spent the past three years in the CLEPO Laboratories of the Frederick Gumm Chemical Company.

Moore

He also spent two years in job plating shops, and one year in electroforming. Moore received his B.S. degree in Chemical Engineering from the Newark College of Engineering, and his M.S. in Metallurgy from Rensselaer Polytechnic Institute. While at R.P.I., he spent two years research on theory and mechanism of chromium and chromium alloy plating. He is also well versed in barrel finishing methods, plating, cleaning, pickling and other aspects of metal finishing.

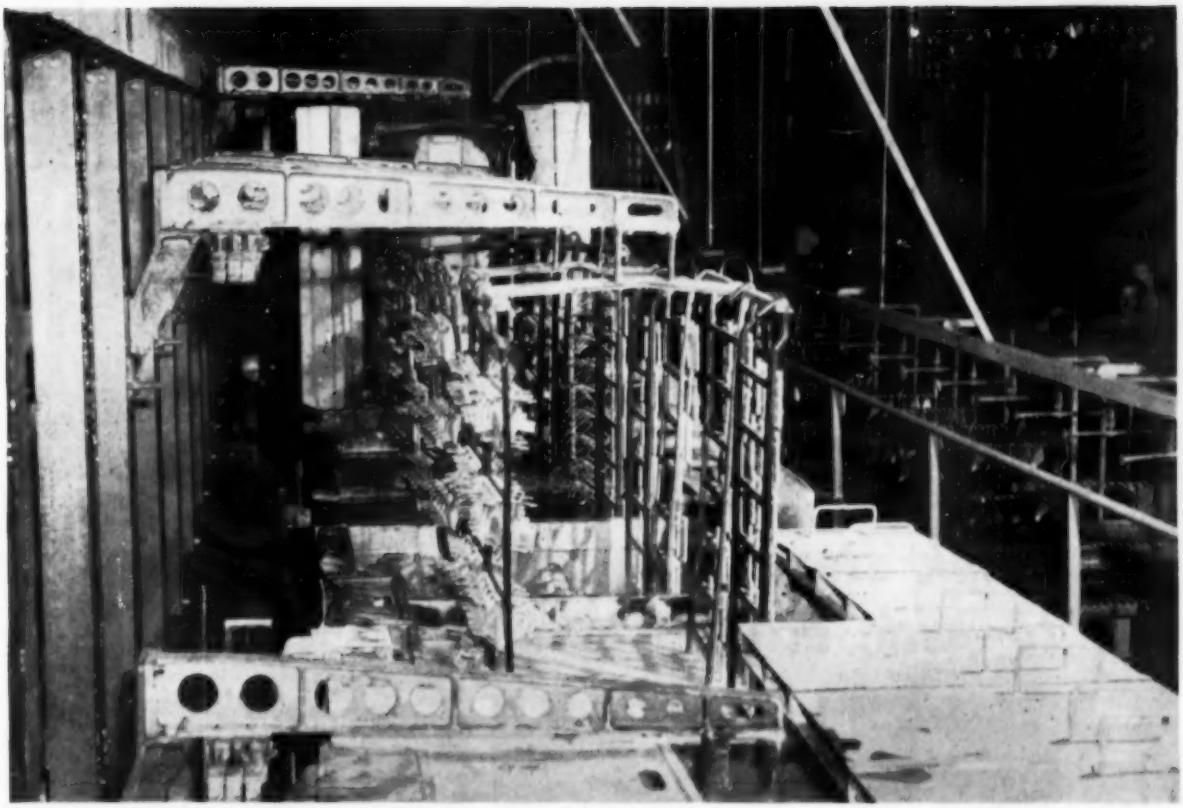
Kay C. Blin has recently joined the staff of L. A. Water Softener Co. of Los Angeles, Calif., as industrial sales engineer and is working out of the company's west coast office.

Blin

A long-time resident of Chicago, Blin left the employ of Industrial Filter & Pump Co. to make his home in Southern California. Platers in California will remember him from his activities with that organization in 1953.

With the L. A. Water Softener Co., he will work with **Gene Schmidt,** their technical director, and call on accounts in the Los Angeles County area.

Blin received his education at the University of Illinois in metallurgical engineering and has been associated with the metal finishing industry ever since. He is a member of the AES.



Zinc plating with fully automatic equipment

Western Electric uses DUROBRITE® Addition Agent 309 for pure, corrosion-resistant zinc deposits

Two hundred racks an hour! That's a fast pace, but with Du Pont "Durobrite" Addition Agent 309 in the bath, zinc plating stays on schedule! At Western Electric's Indianapolis plant, over 300 different telephone parts are given bright, corrosion-resistant zinc coatings. The pure, uniform zinc deposits are ideal for subsequent bright dipping and passivating.

In 1941 Western Electric started using Du Pont cyanide zinc baths. They're still using them today—and getting the same high rate of deposit and high quality of plating.

Whatever *your* zinc plating needs may be, you'll find that economical "Durobrite" Addition Agent 309 can produce bright, uniform zinc deposits of the highest quality . . . cut production costs in any type of plating equipment.

For More Information about Du Pont plating chemicals, call your nearest district office or use coupon below.

DISTRICT OFFICES:
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Chemicals · Processes · Service
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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Del.

Please send me more information on Du Pont Plating Chemicals —properties, advantages and recommended procedures. I am interested in the following types of plating:

☐ Cadmium Plating ☐ Tin Plating
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*Name*_____
*Firm*_____
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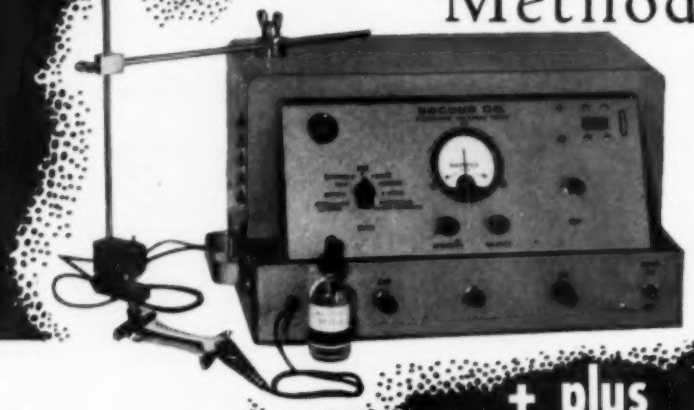
*City*_____ *State*_____

Check plating thickness

WITH THE

KOCOUR ELECTRONIC THICKNESS TESTER*

*Anodic Solution Method



6 Simple steps . . . to quick, accurate results

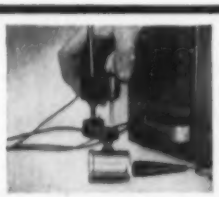
1.

MOUNT THE CELL . . . on the spot to be tested and clip lead wire to specimen.

2.

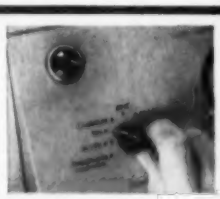
ADD TEST SOLUTION . . . which corresponds to the type of plating and base metal tested.

3.



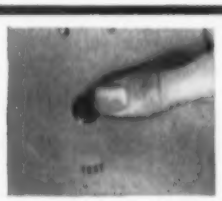
PLACE STIRRER IN POSITION.

4.



SET SELECTOR SWITCH to the type of plating to be tested as indicated on panel.

5.



PRESS THE TEST BUTTON to start the test . . . and upon completion the unit shuts off automatically.

6.

TAKE THE READING directly from the counter on panel i.e., 0.00041".

TOTAL TIME . . . *less than* 2 minutes

+ plus these features

- **DETERMINE THICKNESS OF**
  - decorative chromium
  - heavy chromium
  - silver
  - tin
  - cadmium
  - zinc
  - copper
  - brass
  - nickel
  - lead
  - lead-tin alloy
  - tin zinc alloy

  on various base metals and materials
- **WIDE THICKNESS RANGE**
- **DIRECT READINGS**
- **90-95% ACCURACY**
- **TESTS ARE RAPID**
- **VIRTUALLY AUTOMATIC**
- **ELIMINATES HUMAN ELEMENT**

Don't delay! See how the Electronic Thickness Tester can solve your problem. Write for literature today.

KOCOUR CO.

Pioneers in Control for the Plating Industry

4801 S. St. Louis Avenue
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SEE US . . . BOOTH 442 . . . INDUSTRIAL FINISHING EXPOSITION IN CLEVELAND

NO CURE-ALL FOR SALE!

Experience with plating waste treatment has shown staff and consulting engineers that no one process or type of equipment is generally applicable to all problems. Thorough evaluation of the many factors involved is necessary in each case.

Whether the solution required is ion exchange or precipitation Graver has complete equipment to do the job.

Graver can offer you:

*Choice of either basic process and equipment

*Engineered flexibility to suit individual requirements

*Advanced equipment design proven in hundreds of installations

*Over 45 years' experience in the water and liquid treatment field

WRITE FOR BULLETINS AND TECHNICAL ARTICLES:

WC-103 A — Reactivators • WC-111 — Ion-Exchangers
T-136 — Plating Waste Solutions — Recovery or Disposal
T-130 — Ion Exchange A Practical Tool in the Plating Room
T-123 — Applications of Ion Exchange to Plating Plant Problems

GRAVER

Industrial Waste Treatment Dept. W-113

GRAVER WATER CONDITIONING CO.

A Division of Graver Tank & Mfg. Co., Inc.

216 West 14th Street, New York 11, N. Y.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 628.

Personals

Merritt L. Smith has been appointed executive advisor of Metal & Thermit Corporation, producers of metals, industrial chemicals and welding equipment and supplies, it was announced by **H. E. Martin,** president. As staff coordinator, Smith will assist the president in integrating the company's varied sales activities.

Smith

Smith's experience covers more than twenty years in sales administrative work concurrent with advertising. He was for four years assistant general sales manager and prior to his present appointment was manager of advertising and sales promotion.

Smith attended Dartmouth College and Columbia University, graduating from the latter in 1924 with a B.A. degree.

He is a member of the Industrial Advertisers Association and the Sales Executives Club, and is a member of the Manufacturers Committee of the American Welding Society.

Appointment of **Ned Landon** as manager of public information at the General Electric Research Laboratory was announced by **Dr. C. G. Suits,** G-E vice president and director of research.

Landon joined the staff ot the laboratory as an information specialist in 1954. Previously he had been director of public relations at Knox College, Galesburg, Ill. He was a Phi Beta Kappa graduate of Knox in 1943. During both World War II and the Korean crisis he served as an intelligence officer in the U. S. Army.

F. H. Maas has been appointed superintendent of the Wagner Electric Corporation in Edwardsville, Ill. He succeeds **M. H. Palm** who has been transferred to St. Louis, Mo. Palm's new address is, Wagner Electric Corporation, Large Motor Division, 6400 Plymouth Ave., St. Louis, Mo.

National Carbon Company announced the appointments of **J. M. Schreiner** as Pacific division manager, electrode product sales, with headquarters in San Francisco; **James King, Jr.** as central division manager, electrode product sales, with headquarters in Chicago; **J. S. Copley** as eastern division manager, electrode sales, with headquarters in Pittsburgh; and **J. A. Hammond** as general field manager, electrode product sales, with headquarters in Pittsburgh.

Schreiner was graduated from Yale University with a B.A. degree in economics. After serving four years in the United States Air Force during World War II, he studied engineering at Polytechnic Institute, Brooklyn, N. Y. and joined National Carbon Company as sales engineer in 1947. During the past three years he has been sales representative for electrode product sales, in western Pennsylvania.

Schreiner

King was graduated from Stevens Institute of Technology with a Mechanical Engineering degree. He worked for Koppers Gas and Coke Company, in an operating capacity, before joining National Carbon in 1939. Except for three years spent in plant operation, King has been associated with the sales department.

King

Copley was graduated from West Virginia University, College of Engineering and, subsequently from the Westinghouse Electric Corporation student training course. He became associated with the industrial carbon sales department of National Carbon Company, in 1925, being located in turn in St. Louis, Philadelphia and Cleveland.

Copley

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For the first time, in gold electroplating you can do away with "X Factors", the unknowns and uncertainties that lead to unsatisfactory work. Our new development makes possible fully predictable results in —

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Investigate our Lea-Ronal Bright Copper Process with Lea Copper-Glo.

You can secure the same following advantages as the numerous present users of the Lea-Ronal Bright Copper Process:

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There are other advantages but these six—all outstanding—will give you an idea as to what you can expect if you convert your tanks—still or barrel—to the Lea-Ronal Process using Lea Copper-Glo. Ask for a laboratory test sample. Better yet, order sufficient quantity to make a good trial production run in your plant. **Write or phone The Lea Mfg. Co., 16 Cherry Avenue, Waterbury 20, Conn., through whom the Lea-Ronal Bright Copper Process and Lea Copper-Glo are exclusively marketed.**

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REPORTS from all over

. . . stripped, cleaned and degreased

(This section is especially compiled for the readers of PLATING; here the world in which we work and operate is stripped of its veneer, cleansed of its distortions and carefully degreased of superfluities).

Business activities have continued to move upward and no let-down is expected until vacation time.

METALS—Demand for nonferrous metals continued at a lively pace. This is partly caused by the sustained high activity in the construction, automobile, and durable goods industries. . . . The copper shortage was relieved by the US and UK's releases of government reserves other than stockpiled metal. Despite higher prices paid outside the US, copper managed to hold at 36 cents per pound. Production of copper is rising. . . . Zinc advanced one-half cent. On April 3, a radio commentator predicted a price rise for zinc. This brought on a demand for the metal that caused the price to rise. . . . Aluminum output in March was 130,272 tons—a new high. . . . Nickel production reached 390 million pounds in 1954 and is expected to rise to at least 450 million pounds by 1958.

Quotations on all metals quoted:

ALUMINUM—(99 per cent pure plus ingot)	23.200
ANTIMONY—Five tons or more but less than carload	31.970
Bulk	28.500
In cases (Port Laredo)	29.000
CADMIUM—Producers' quotation	170.000
Producers' and platers' quotation	170.000
Platers' quotation	170.000
COPPER—Electrolytic, domestic	35.700
Electrolytic, export	37.938
GOLD—(per ounce U. S. price)	$35.000
LEAD—Common, New York	15.000
Common, St. Louis	14.800
MAGNESIUM—(ingot)	28.500
MERCURY—(per 76 lb flask)	$315.846
NICKEL—(F.O.B. Port Colborne U. S. duty included)	64.500
PLATINUM—(refined per oz)	$78.500
SILVER—New York, per/ounce	87.071
London, pence/oz	75.711
TIN—New York	91.413
New York, 99 per cent min	90.413
ZINC—Prime Western (E St. L.)	11.925
Prime Western (delivered)	12.425

METAL INDUSTRIES—Reactions of metals with titanium carbide and titanium nitride showed that molybdenum was the only metal which would not react with either at 1800° C. The most active was zirconium. . . . The new Nionel acid resistant alloy by *International Nickel Company* contains about 40 per cent Ni, 21 per cent Cr, 3 per cent Mo, 1.75 per cent Cu and 31 per cent Fe and small amounts of Mn, Si, and C. It is claimed to be considerably more resistant to sulfuric, sulfurous and phosphoric acid solutions than any common stainless steel. It also shows good resistance to pitting attack in sea water. . . . Krupp Co. of Essen, Germany, are the first company in Europe to begin commercial production of titanium metal.

WATER TREATMENT—Molybdenum as a commercial inhibitor in water treatment is being tested by "several companies." They claim that present studies show the cost will be comparable with other inhibitors. . . . *Hercules Powder Co.*, Wilmington, Del., claims small amounts of its Delrad will destroy algae in ponds, irrigation canals, etc. The algae are said to be disintegrated so that there are no undesirable odors, clogging of valves and other difficulties.

INDUSTRIAL RESEARCH—A completely equipped instrumentation laboratory has been outfitted at *Armour Research Foundation of Illinois Institute of Technology* to be used on projects where it is impractical to move equipment or material to a fixed laboratory. It is equipped to measure and record a wide variety of mechanical phenomena.

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1	0.60	Adhesion of Electrodeposits, Parts I, II, and III	A. L. Ferguson & E. F. Stephan
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16	1.00	Determination of Impurities in Electroplating Solutions, Parts XV-XIX	E. J. Serfass & Co-workers
17	1.00	Porosity of Electrodeposited Metals	N. Thon, Denis Keleman & Ling Yang
19	0.65	Analytical Methods for the Determination of Cyanides and Cyanates in Plating Wastes and in Effluents from Treatment Processes	B. F. Dodge, W. Zabban, E. J. Serfass, & R. B. Freeman
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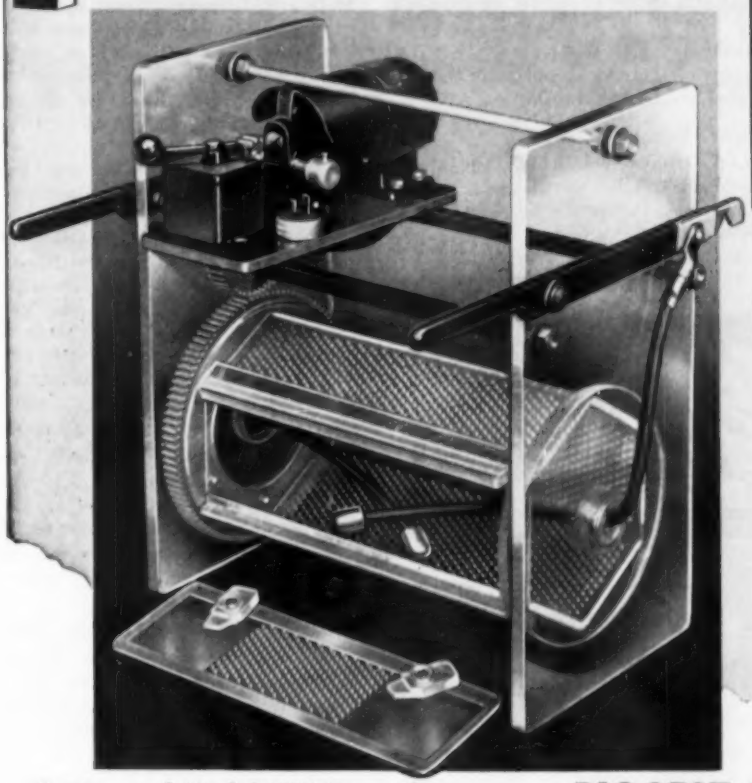

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115 V, 60 C, 1 Ph. Motor

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Features of Model SPX Porto-Plater

Notched "V" Cathode Contact fits Cathode Rod at any point on the rod.

Complete Lucite End Plates — Support plater — protect cylinder and mechanism in handling.

Reversing Switch with self-contained motor drive —Motor turns cylinder in either direction and holds positively for loading and unloading.

Obstruction-free Cylinder—One-piece molded High Temperature Lucite shell welded to cylinder ends. No ribs, no tie rods, no crevices.

Attached Lucite Cover Locks — Always on the cover. Never misplaced or dropped in tank.

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High Temperature Lucite—Cylinder, cover, cover locks, hangers, gears and bushings.

Cylinder perforations 3/32" unless specified.

Cylinder, O.D. 9x15"; I.D. 6x12".

Weight Empty, 28 lbs. Plating Capacity, ¼ peck.

Geared head motor, 1/50 HP, 115 V, 60 C, 1 Ph.

BIGGEST VALUE ever produced in a LUCITE PORTO-PLATER

New features and low price, made possible by BELKE BIG VOLUME PRODUCTION, add up to TREMENDOUS VALUE far greater than ever before obtainable.

A flood of orders in excess of production has created a big backlog with extended delivery dates.

To avoid disappointment, please order well in advance of your needs. Deliveries must be scheduled on the basis of first come first served.

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Personals

Hammond was graduated from Clemson College with a B.S. degree in electrical engineering, and immediately joined Westinghouse Electric Corporation as a sales engineer in New Orleans. He became associated with National Carbon Company in 1923, as sales engineer, and has since held a number of administrative positions in the industrial sales department. He was eastern regional manager before receiving his present appointment.

Hammond

Election of **Vincent P. Reinfeld** as president of Pyrosil, Inc., Cuyahoga Falls, Ohio, manufacturers of industrial electroplating, infra-red oven and acid pickling accessories has been announced.

Reinfeld

Reinfeld has been associated with Executive Services of Cleveland, management consultants on plant scheduling and inventory control and will continue as a technical consultant for the firm.

H. S. (Bud) Schuler has joined the Beckman Division of Beckman Instruments, Inc., Fullerton, Calif., as advertising and sales promotion manager.

Prior to his new appointment, Schuler spent 18 years with the Westinghouse Electric Corporation in various advertising executive capacities. His post for the past two years was assistant general advertising manager, working out of Westinghouse's Pittsburg, Pa. headquarters. Schuler also served as account executive with the Pittsburgh advertising agency of Ketchum, MacLeod and Grove.

Robert C. McDowell, president of McDowell Company, Inc., Cleveland, Ohio, has announced the appointment of **Harold E. Rowen** as general manager of the firm's new Dwight-Lloyd Division.

Rowen

Rowen was formerly vice president of Sintering Machinery Corporation, of Netcong, N. J., producer of Dwight-Lloyd sintering machines, all assets of which were recently acquired by McDowell Company.

Associated with Sintering since 1920, Rowen has been responsible for many important developments in the design and application of the Dwight-Lloyd process for sintering, heat treating, roasting, and agglomerating operations in the metallurgical field. He holds numerous U. S. and foreign patents on sintering processes and designs.

Rowen is a native of Leadville, Colo., and is a graduate of Culver Military Academy. He served in the United States Navy in World War I, and is a life member of the American Legion, of which he is a Past State Commander (N. J.), and Past Sussex County (N. J.) Commander. Other affiliations include membership in the American Institute of Mining and Metallurgical Engineers, New York section.

Henry Kraus has been added to the engineering staff at Davies Supply and Manufacturing Company, St. Louis, it was announced by company president **L. A. Davies.**

Kraus

Kraus graduated from Washington University (St. Louis) with a B.S. in chemical engineering. He comes to Davies from Emerson Electric where he spent six years as a materials and methods engineer concerned with electroplating. At Davies, Kraus will concentrate chiefly on job estimating and cost analysis.

GRIND
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BUFF
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with a Hammond ROTARY AUTOMATIC

Model "K" Hammond Automatic Finishing Machines are made in 34", 46" and 62" table sizes. These models are either continuous or for indexing at 150 to 1700 indexes per hour. Head styles include floating, non-floating with 3 H.P. to 20 H.P. range. Also available are attachments for converting heads from buffing to abrasive belt polishing. The Hammond Model "K" will speed up your grinding, polishing, buffing, brushing and de-burring operations. Send us samples and learn how much you can speed them up.

SEND SAMPLES and we'll show you how much you can speed production and cut costs.

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"SEE US AT BOOTHS 370-371 INDUSTRIAL FINISHING SHOW"

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reports large Midwestern manufacturer

That's what happened when this major manufacturer put Cowles NS —heavy duty soak cleaner—in its cleaner tanks. Tank life was doubled, quality of cleaning was improved, and total cost was reduced greatly.

Cowles NS eliminates soap scum build-up to assure long tank life and prevent deposition of scum on cleaned parts. High emulsification properties of Cowles NS keep the tank clear and reduce the costly, time-consuming process of dumping, cleaning and recharging tanks—jobs can be run *up to twice as long* without changing.

Cowles NS provides outstanding cleaning results and its flexibility permits its successful application in both porcelain enamel plants and in plating plants.

Your Cowles Technical Representative will be very happy to discuss your soak cleaning problems with you and help bring the same exceptional results with Cowles NS that this and many other plants have experienced. Write or call today.

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Personals

John Dewey has been named Chicago branch sales manager of the Warner Electric Brake & Clutch Company, Beloit, Wis., it was announced by **Norman K. Anderson,** general sales manager of the Wisconsin firm.

Dewey

Dewey attended the University of Iowa and formerly served as administrative assistant to Anderson in the Beloit headquarters of the firm. He joined the Warner organization in 1952.

Wright H. Manvel, former manager of personnel relations for G.E.'s Major Appliance Division, Louisville, Ky., has been appointed manager of employee and plant community relations at Carboloy Department of General Electric Company, Detroit, **K. R. Beardslee,** general manager announced.

Manvel

Manvel succeeds **Philip D. Moore,** recently appointed manager of General Electric employee and plant community relations for the Pittsfield, Mass., area.

A General Electric employee for 22 years, Manvel began his career with the company in 1933, upon graduation as a mechanical engineer from Worcester Polytechnic Institute. His early assignments at General Electric's Schenectady, N. Y., and Bridgeport, Conn. Works, ranged from test and advanced engineering programs to manufacturing methods. From 1939 until the Major Appliance Division was organized in 1951, he was a member of the managers committee at the Bridgeport Appliance and Merchandising Department, handling union negotiations.

Robert C. McDowell, president of McDowell Company, Inc., engineers and contractors announced that the overall sales program of the McDowell enterprises has been combined and coordinated and that **Curtis L. Willmott,** vice-president will direct such activities for all divisions now included within the company's orbit.

Willmott

In his expanded capacity, Willmott will not only direct sales activities of the parent McDowell Company, but also those of McDowell controlled Wellman Engineering Company of Cleveland, its divisions, including Williams Bucket, Akron; Locomotive Crane, Cleveland; Dwight-Lloyd, Cleveland; and the Anker-Holth Division, Port Huron, Mich. McDowell also announced that Willmott has been elected to the Wellman Company's board of directors.

Willmott, in turn, announced the appointment of **John J. McGlone** as sales manager of Wellman's Williams Bucket Division. McGlone was recently associated with the Blaw-Knox Company, of Pittsburgh. An electrical engineering graduate of the University of Minnesota, he had previously served as an inspector with the Bridge Operators' and Inspectors' Association.

The appointment of **Dr. Herbert Bandes** as manager of the chemistry laboratory of Sylvania Electric Products Inc. was announced by **Dr. Robert M. Bowie,** the company's director of engineering and research.

Bandes

Dr. Bowie said that the chemistry laboratory was formerly a part of the company's physics laboratory but that Sylvania research in chemistry has expanded to the point at which it is advisable to administer the chemistry laboratory as a separate organizational unit under Dr. Bandes.

Since joining Sylvania as a senior engineer in 1944, Dr. Bandes has been inter-

New discovery solves acid copper plating problems...cuts plating costs

NEW ANACONDA

"PLUS-4" ANODES

(PHOSPHORIZED COPPER)

WHY PLATING WITH "PLUS-4" ANODES COSTS LESS!

+1 no anode sludge

+2 no copper "build-up" in solution

+3 smooth, heavy cathode deposits (no "bagging" or diaphragms required)

+4 up to 15% more cathode deposit per anode

ANACONDA "Plus-4" Anodes are the result of a revolutionary research discovery which disclosed that controlled additions of phosphorus and certain other elements to electrolytic tough pitch copper produced an anode for acid copper plating with which sludging off of copper particles was completely suppressed. This phenomenon eliminated copper sludge, copper "build-up" in the electrolyte, and migration of copper particles to the cathode causing nodular roughness. It was also discovered that anodes of phosphorized copper corroded much more uniformly, leaving a small, compact "fish" – providing an additional saving in scrap loss. ANACONDA "Plus-4" Anodes are made in all standard sizes and shapes . . . cost no more than ordinary rolled anodes.

SPECIAL TRIAL ORDER –

For details on how you can get a test supply of "Plus-4" Anodes sufficient to fill one tank, write to *The American Brass Company, Waterbury 20, Conn.* In Canada: *Anaconda American Brass Ltd., New Toronto, Ont.*

*For use under Patent No. 2,689,216

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PRECIOUS METAL SALTS & SOLUTIONS

As specialists in the precious metals, we have both the facilities and the trained personnel best able to produce salts and solutions for the plater. As a result, ours enjoy a well earned reputation for high quality and consistent performance.

RHODIUM PLATING SOLUTION
It was in our plant that the answer to the problem of rhodium plating on a commercial scale was found. Our solution is made under the direct supervision of the men responsible for this development.

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We have developed platinum plating to a point where it stands upon a truly scientific basis. Both flash and heavy deposits are made from the same solution.

PALLADIUM PLATING SOLUTION
Produces a flash plate in from 15 to 60 seconds. Heavy deposits can be made from the same solution. Gives excellent results in plating connectors, wave-guides and other electronic equipment.

CONCENTRATED GOLD PLATING SOLUTION No. 319
Containing one ounce of fine gold.

CONCENTRATED REPLENISHING SOLUTION No. 320
Containing one ounce of fine gold.

CONCENTRATED UNDERPLATE OR STRIKE No. 321S
Containing one-half ounce of fine gold.

GOLD COLORING SOLUTIONS
For light, yellow, red and green gold.

HIGH GOLD CYANIDES
Our sodium-gold cyanide contains 71.5 per cent of fine gold and our potassium-gold cyanide 67 per cent as compared with commercial salts of 46 and 41 per cent. Gold content for gold content, our high gold cyanides cost you no more. We make the commercial 46 and 41 per cent salts too.

SILVER SALTS—SILVER ANODES
We make silver cyanide and silver nitrate as well as silver anodes.

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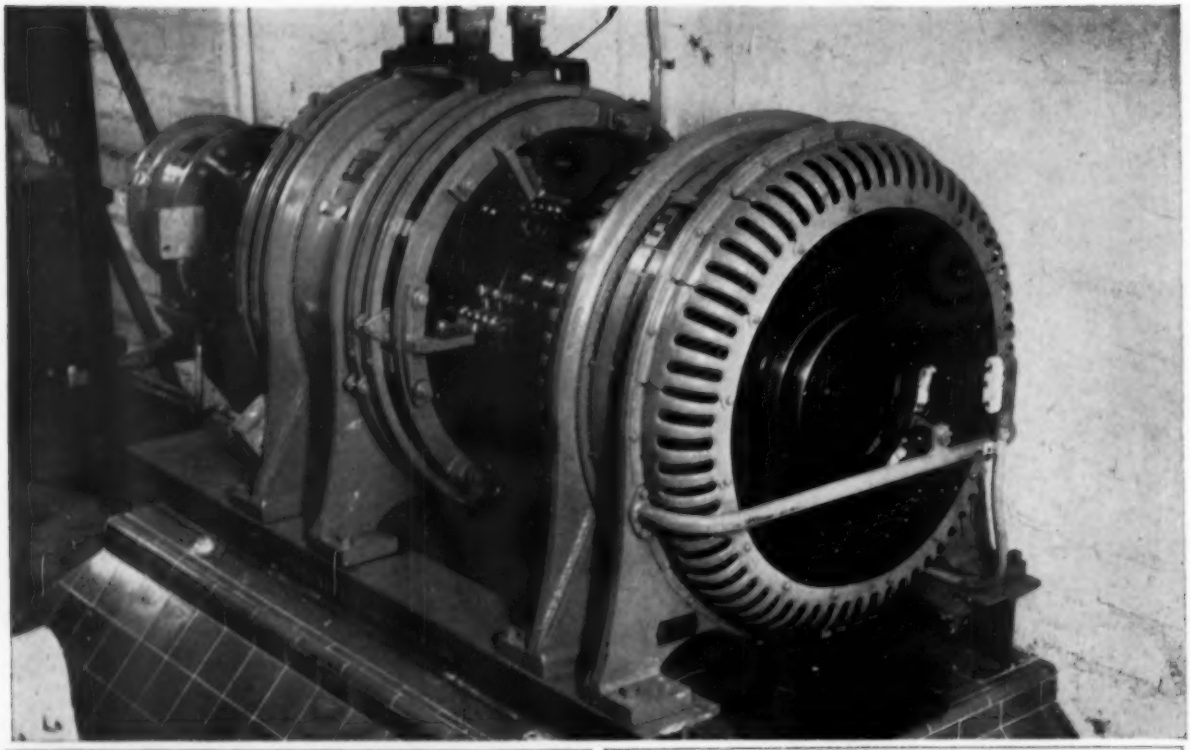

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Long life and continuous efficient operation of Chandeysson Generators is assured by a combination of the finest, most durable materials . . . proven design . . . and conservative engineering with plenty of overload capacity.

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BE SURE OF POWER WHEN YOU NEED IT MOST . . . overload capacity as great as 50% momentarily and 25% sustained, without distress or damage.

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ENJOY LIFETIME POWER DIVIDENDS . . . sustained, lifetime overall constant efficiency as high as 85% does not decrease with age or overload.

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CHANDEYSSON ELECTRIC COMPANY • 4078 Bingham Ave., St. Louis 16, Missouri 52

Personals

ested in the fields of electroplating, radiochemistry, luminescence, inorganic semiconductors, and solid state physics. Dr. Bandes received a Ph.D. degree in physical chemistry from the University of Michigan in 1938. Following a year in the electroplating industry, he served the Naval Bureau of Ordnance for two and a half years as a physicist. He then joined the Kellex Corporation (Manhattan District) as a group leader in electrochemistry and was with that organization up until the time he joined Sylvania.

Dr. Bandes has published papers in the fields of electrochemistry and electrodeposition, and has frequently lectured to professional groups. He is a member of the ACS, the AES, and the Electrochemical Society. He is vice-chairman (luminescence group) of the Electrochemical Society's Electronics Division, holds membership on several committees of that Society, and is a past chairman of its New York Metropolitan Section.

R. A. Bristol, director in charge of overall sales activities of The Foxboro Company, Foxboro, Mass., announced the appointments of **C. C. Fuller** as vice-president, augmenting the sales management staff, **H. O. Ehrisman** as general sales manager, and **J. J. Burnett** as field sales manager. Schwarzler will continue to direct Foxboro's expanding international operations. Vice-president **C. E. Sullivan,** who has retired from active sales direction, will serve in a consulting capacity with the sales organization.

Ehrisman

Also announced was the formation of a sales product development committee headed by Fuller and a sales policy committee with Ehrisman as chairman, further coordinating the company's sales engineering and manufacturing functions.

Fuller joined the company in 1920 and was assigned to the New York office as sales engineer. In 1930 he became manager of the New York branch and nine years later was named division manager, responsible for instrument sales activities in the Atlantic division. Since 1941 he has served as assistant general sales manager.

Ehrisman joined the firm in 1936, specializing in control instrumentation for the paper industry. Later he became manager of instrument sales in the pulp and paper, rubber, and textile industries and during the war supervised Foxboro's manufacture of radar trainer equipment supplied to the U. S. Signal Corps. In 1945 he was appointed manager of sales promotion, and in 1949, assistant general sales manager. He previously served for eight years as sales engineer and district manager with the Atlantic Precision Instrument Company of Malden, Mass.

Burnett, who will have general supervision over Foxboro's 48 branch offices throughout the United States, has been with the company since 1925, serving successively as sales engineer, Chicago branch manager, district manager, and in recent years, manager of Foxboro's Central division.

Glenn W. Graf has been named manager, sales promotion of Le Roi Division Westinghouse Air Brake Company. He succeeds **Richard H. Koehler** who was recently appointed director of advertising and publicity for WABCO and is now working out of company headquarters in Pittsburgh.

Graf

Graf has been in the sales promotion department of the Milwaukee division for more than two years. Prior to joining Le Roi he spent two years in an editorial position with Bucyrus-Erie Company. His background also includes newspaper and radio work in western Pennsylvania. He is a graduate of the University of Wisconsin School of Journalism.

FOR LOWER DRYING COSTS!

As optional equipment with any Nobles Centrifugal Dryer, you may have efficient steam or electric heaters safely and compactly mounted in the cover. Heat doesn't come from an auxiliary unit and transfer through pipes . . . it saves space, saves heat.

It's only one of many features you'll like about this machine of advanced design. It's completely different in principle. The old way was to *blow* air down at the parts. A powerful suction fan *draws* the air from the bottom of the modern Nobles Dryer. Fresh air rushes in from the top to fill the vacuum, is drawn evenly through the entire contents and exhausted at the bottom.

You'll like its extra weight, its smoothness, its freedom from vibration. As one user put it, "Certainly it depreciates less and requires less maintenance than any competitive product."

In the interest of lower drying costs, write for more information today!

NOBLES ENGINEERING & MANUFACTURING CO.

[illegible] EAST SEVENTH STREET ST. PAUL 6, MINNESOTA

Write Today for the FREE NOBLES-DRYER BROCHURE

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 633.

***Each* of these new outstanding Harshaw bright nickel plating processes has certain unusual characteristics which fit it to the product finish required in your plant.**

Top brightness with thin deposits . . . Especially outstanding color performance in applications where little or no basis metal finishing is done prior to plating. . . . Perglow or Nubrite deposits are extremely receptive to chrome plating . . . Unique leveling results of Perglow or Nubrite have a hiding and filling effect on surface defects which other nickel deposits tend to emphasize. Polishing costs are decreased.

For application in your plant, phone or write our nearest office.

NEW HARSHAW

Nubrite

THE HARSHAW CHEMICAL COMPANY

1945 East 97th Street • Cleveland 6, Ohio

Chicago 32, Ill. • Cincinnati 13, Ohio • Cleveland 6, Ohio • Houston 11, Texas
Los Angeles 22, Calif. • Detroit 28, Michigan • Philadelphia 48, Penna.
Pittsburgh 22, Penna. • New York 17, N. Y.

GOLD SALTS

BY AUROMET

Auromet Gold Salts are made from U. S. Treasury gold to insure purity and uniformity.

Auromet Gold Salts are manufactured in our modern plant by skilled scientific craftsmen following the trade's most exacting specifications.

Auromet Gold Salts are available in 67.5%, 67%, 50%, 46%, 41% gold and any other lower percentage.

Auromet Corporation also manufactures Bright Gold, Silver, Silver Cyanide and Nitrate, Platinum, Palladium and Rhodium Concentrates.

For complete information and technical service call WOrth 6-0863 collect.

AUROMET

AUROMET CORPORATION

199 CANAL ST., NEW YORK 13, N. Y.

Personals

The Plating Institute of Michigan announces the election of its officers for the coming year:

William G. Crawford, Peerless Chrome Co., Detroit, Mich., has been elected President.

Crawford

William Savin, Harding Manufacturing Co., Inc., has been elected Vice-President.

Bud Adelsperger, Auto City Plating Co., has been elected Treasurer.

The members of the Board of Directors, in addition to the above officers are: **John Reilly,** Reilly Plating Co.; **Glenn H. Friedt, Jr.,** United Platers, Inc.; **Robert J. Huber,** Michigan Chrome and Chemical Co.; and **Howard E. Morse, Jr.,** Northeastern Plating Co.

The Plating Institute of Michigan is a trade association whose members are engaged in the job-electroplating industry. The members are located in the Metropolitan Detroit area, Pontiac, Saginaw and Northern Ohio. The members supply approximately 75 per cent of the job-plating capacity in the area.

Lasalco, Incorporated of St. Louis recently announced the appointment of **William E. Trembley** as their representative on their entire line of equipment and supplies in the state of Texas and southern Oklahoma. His headquarters address is 113 Perry Road, Irving, Tex., a suburb of Dallas.

Trembley is well equipped through experience and training to serve all independent electroplating shops and manufacturers. He has a B.S. degree, and has eight years in the plating field in various capacities.

H. R. Fosnot, sales manager, Graver Water Conditioning Co., New York, N. Y., has announced the appointment of **J. D. Crell** as sales engineer for the New York City sales district.

Crell will work out of the New York office at 216 West 14th Street. He has been with Graver for several years and is completely familiar with all phases of industrial, municipal and industrial waste treatment.

Dr. Hamnett P. Munger has been named a technical advisor at Battelle Institute, Columbus, Ohio. In his new position he will advise both the Institute and its clients on pilot-plant and large-scale studies in chemistry, mechanical engineering, metallurgy, and related fields.

THE FINISHING TOUCH

FINISHING OF ALUMINUM AND ZINC BASE DIE CASTINGS

by D. J. Swaninger
Sales Manager—Stevens Compositions

Each year, during the past decade, the use of zinc base and aluminum die castings has been on the ascendancy. Increased uses have been particularly noted in the automotive, aircraft, appliance, plumbing and radio-television industries.

New finishing techniques have played no small part in the rapid up-surge of die castings usage. The fine detail obtainable makes die castings ideal for decorative hardware and trim.

There are many finishing methods for aluminum or zinc base die castings. The choice is dependent upon final use of the individual part or product.

Typical die cast buffing operation on Stevens lathe.

For aluminum there is polishing, buffing, coloring, scratch-brushing, satin finishing, tumbling, etching, anodizing, bright dipping and electroplating.

For zinc polishing, buffing, tumbling and electroplating methods are used.

Which is best for you? Which will give the finish needed to make your product more saleable at the lowest cost to you?

Frederic B. Stevens, Inc., with their years of experience, can recommend the correct finishing procedure and furnish the equipment and supplies needed for the finishing of aluminum or zinc base die castings. Whether it is chemicals,

Stevens Model 8 Copper, Nickel, Chrome Die Cast Plating Machine.

compositions, lathes, automatic polishing equipment, Roto-Finish equipment or completely automatic electroplating and finishing machines, Stevens has it.

Perhaps we can help you with a Stevens L. V.* report. Write us on your company letterhead describing your product, the finish desired and required production.

*Laboratory Verified.

See the Stevens exhibit at the 4th Industrial Finishing Exposition, Cleveland, June 20 to 23. Booth No. 112.

FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

For Rapid Barrel Finishing

EXOLON

Tumbling Abrasive

Various stamped, die cast, forged and screw machine parts before and after barrel finishing with EXOLON abrasives.

• More and more manufacturers are turning to barrel finishing for its big savings and uniformity over individual hand finishing.

Naturally, the process is only as effective as the abrasive used. In response to the demand for a fast-cutting, long-life abrasive, EXOLON has developed this superhard aluminum oxide grain which is *barrel-finished itself* for non-scratch, precision smoothing of your metal surfaces.

May we barrel-finish some of your sample parts *at no obligation to you?* Or, if you prefer, we are prepared to furnish you trial lots of Exolon Barrel Finishing Abrasive at quantity discount for trial in your own barrel. You will find, as others are finding daily, that it gives you a superior finish at substantially lower cost. Write today!

SINGLE OPERATION ECONOMY

★ IN CLEANING UP
★ IN REMOVING BURRS
★ IN REMOVING SCALE

from:

- forgings
- metal castings
- metal stampings
- machined parts

which can be handled in the barrel.

WRITE TODAY FOR DETAILS including our new fact-filled catalog.

The EXOLON Company

973 East Niagara Street, Tonawanda, N. Y.
Thorold, Ontario, Canada

Manufacturers of SILICON CARBIDE *and* ALUMINUM OXIDE ABRASIVES

Trade Literature

Please use Reader Service Card to obtain any item in this section

L—600. Pipe Line Filters Detailed—Its line of Type "PL" Pipe Line Filters, designed for removal of water, oil, dirt and pipe scale from compressed air or gas lines, is detailed in a new brochure now available from the Air-Maze Corporation, 25000 Miles Road, Cleveland 28, Ohio.

The filters have been engineered for pressures up to 150 lbs. gauge. Standard models are furnished for pipe sizes to 2 inches while special models are available to 6-inch pipe size. Design features include extremely low pressure drop which does not exceed three ounces; ease of disassembly for inspection purposes; permanent type separator-element which may be easily cleaned in hot water; an element of brass and bronze construction; corrosion-proof steel shell; cast-iron head, threaded inlet and outlet connections; an absence of moving parts; hydrostatically pressure tested to 250 lbs., psi.

L—601. Dip and Flow—Technical bulletins on dip tank and flowcoat finishing have just been prepared by the Du Pont Industrial Finishes Division and are available on request.

The eight-page, illustrated bulletins describe the processes, discuss advantages and disadvantages of the two finishing techniques. Size and shape of dip tanks, methods of dipping, hanging of the ware, methods of agitation, tank control, as well as general suggestions and precautions are treated in the dip tank bulletin. The flowcoat brochure includes sections on limitations of flowcoating, operating variables, surface preparation, primers, topcoats, and thinners.

L—602. Sensitivities of Coated Abrasives—Topnotch performance of coated abrasives depends to a large degree on the conditions under which the product is stored prior to its use, according to a booklet, "How to Store Coated Abrasives," prepared by Armour and Company, Coated Abrasives Division.

The backing and adhesive of coated abrasives are sensitive to climatic conditions and the rise and fall of a storage room's relative humidity causes strains to be set up between the abrasive and adhesive.

Further, when coated abrasives are stored under high humidity, they tend to fill and clog when put to use. If allowed to become too dry, the product will crack.

The eight-page illustrated booklet describes temperature and humidity limits for proper storage and suggests an ideal storage room location.

L—603. Industrial Equipment Catalogue—A new 16-page catalogue has just been published by Precision Equipment Company. The inside cover of this catalogue features a list of Conversion factors, which will prove helpful to Engineers and other executives. Free reprints on card stock may be obtained if requested on Company letterhead.

Precision Publication

Many new and different items have been added to Precision's standard line of lockers, ladders, steel shelving and the storage and maintenance equipment for industrial and institutional uses.

L—604. Folding Tables—An eight page brochure describing the complete line of folding, portable tables built by Sico Manufacturing Co., Inc., for schools, institutions and industry has recently been issued by the Minneapolis firm.

Five tables are shown separately and in various applications, while architect's formal job specifications are listed under each item. Also included in the brochure is a brief explanation of the Sico System of cafeteria seating, a list of product advantages and complete operating instructions.

Sico's Tables

L—605. Soft Metal Furnaces—New sizes, holding capacities, and BTU inputs for the soft metal reverberatory furnace of the dry hearth type have just been incorporated into a new bulletin by Eclipse Fuel Engineering Co. It should be noted, too, that a new unit, the hydraulic nose pour type, is now available in addition to the standard dip-out models.

Cut-away views, product photos and complete specifications point out the many exclusive advantages and design features Eclipse has developed to secure faster production of higher quality metals at a lower cost.

L—606. Book on Soft Water—The Water Conditioning Research Council announces its publication of a new book, "Soft Water in Modern Use," (cost: $2.50) which describes the role of soft water in modern domestic living. It is based on extensive studies made by Dr. Cornelia A. Tyler of Foster D. Snell, Inc., consulting chemists and engineers of New York City.

The new 48-page volume outlines the differences between hard water and soft and uses government statistics to show that water taken from the Great Lakes is hard.

The principal methods of softening water are described. The "cation-exchange" process, universally used in domestic water-softening appliances, is treated in detail. The book cautions against water-softening "devices"—many are outright frauds—which do not actually remove the calcium and magnesium salts from the water. These are the hardness elements that must be removed to produce soft water.

"Soft Water in Modern Use" is available for $2.50 from the Water Conditioning Research Council, 111 W. Washington St., Chicago 2, Ill.

L—607. Automatic Controls—The enclosed Automatic Control Systems Bulletin No. S-10 is hot off the press! It describes in detail how ATC can assist in arriving at the right application of an automatic control system.

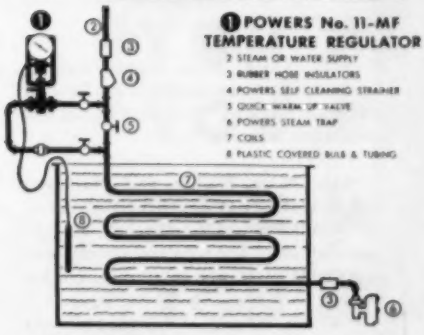
Case histories are presented along with a description of the scope of ATC Co. services in the phases of design, purchasing, construction, and start-up of packaged Automatic Control Systems.

L—608. Milliohmeters and Microhmeters—Ten highly accurate milliohmeters and microhmeters for measuring low resistances between 0.0001 ohm and 100 ohms are described in Engineering Bulletin L-39, recently prepared by the Shalleross Manufacturing Company, Collingdale, Pa.

Shalleross Low Resistance Test Sets are recommended for applications where a Kelvin Bridge is too slow or impractical, and where an ordinary non-linear ohmeter is too inaccurate and limited in range.

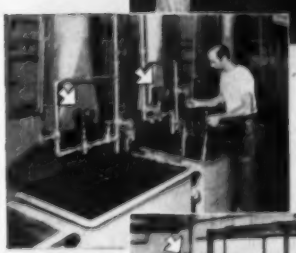
Cut Cost of Metal Finishing Processes

and Get Better Quality Products


1 POWERS No. 11-MF TEMPERATURE REGULATOR
2 STEAM OR WATER SUPPLY
3 RUBBER HOSE INSULATORS
4 POWERS SELF CLEANING STRAINER
5 QUICK WARM UP VALVE
6 POWERS STEAM TRAP
7 COILS
8 PLASTIC COVERED BULB & TUBING

Holds Temperature Where You Want It.

USED BY LEADERS IN THE INDUSTRY



Install POWERS

No. 11-MF Self-Operating Temperature Regulator
Saves Labor and Steam, prevents solution "boil-over"
Helps get most effective use from various solutions

Plastic Covered Thermal Bulb and Tubing are highly resistant to metal finishing solutions. Prevents electrical shorts. No insulators are required for the regulator.

Easy to read 4" Dial Thermometer indicates temperature of solution under control. It gives a visual check of the process and makes it easy to adjust regulator for different temperatures.

Eliminate "the human element" in temperature control with Powers automatic Regulators. They're simple, compact and dependable. They stop OVER-heating, prevent "boil-overs," waste of steam, water wasted by evaporation, burnt plated parts, rejected anodizing, decomposition of costly additives and loss of volatile ingredients from some cleaning solutions.

(b69)

Phone or write your nearest Powers office for Bulletin 330

POWERS CONTROL

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS • Offices in Over 50 Cities in U. S. A., CANADA and MEXICO

See Your Telephone Directory

OVER 60 YEARS OF AUTOMATIC TEMPERATURE CONTROL

Trade Literature

L—609. Stainless Steel Deaerator—The L. A. Water Softener Company of Glendale, Calif., presents its new stainless steel deaerator in Bulletin 102.

This informative booklet offers a complete description of the special features incorporated in L. A.'s latest jet atomizing deaerator development and emphasizes the many operational advantages to be gained from corrosion-resistant equipment of this type.

In addition to their all stainless internals, these new L. A. Deaerators feature efficient counter current two-stage deaeration action, positive steam scrubbing action and complete self-adjustment at all loads without springs, mechanical devices or moving parts of any kind.

L—610. Abrasive Belt Machining—"Abrasive Belt Machining," a new 23-page catalogue describing in detail the application methods of the Engelberg Huller Company's complete line of abrasive belt machines has just been announced by the Syracuse firm.

This catalogue also explains the operation of the five types of abrasive belt machining, pointing out their savings in time, labor, spoilage and space costs. The Engelberg Huller Company acquired the abrasive machine division of the Porter Cable Machine Company in 1953 and since that time has improved the line and expanded it by the designing of new equipment.

L—611. Oxygen Analyzer—Arnold O. Beckman, Inc., pioneers of the advanced paramagnetic Oxygen Analyzers that provide a direct measurement of oxygen content, have published an informative new bulletin describing their Model C and Model C2P Oxygen Analyzers.

The Model C Analyzer is a simple convenient, low-cost instrument that can be used for measuring the oxygen content of either continuously-flowing gas samples or fixed volume samples as small as 3 cc. With either type of sample the oxygen content is read directly from a translucent scale, without use of catalysts, filaments, chemicals, or complicated mechanical hook-ups.

L—612. Gold, Men, Gold—Technic, Inc. has published a reprint of Dr. Edward A. Parker's article, "Analysis of Gold and Gold Alloy Solutions".

L—613. Wire, Ribbon and Plating—A new booklet describing the facilities of Sylvania Electric Products Inc., for the manufacture of fine wire and ribbon, wire and ribbon parts, and small parts plating has just been issued by the company.

The new 12-page booklet, profusely illustrated, shows Sylvania's machinery which can cope with most any kind of wire process problem and it also carries valuable chemical composition charts indicating percentages of base material used in Sylvania fine wire and ribbon.

L—614. Sh-Sh!—"The Silent Treatment," a comprehensive new booklet covering vermiculite acoustical plastic and its application, has been issued by Vermiculite Institute of Chicago.

The booklet contains a table of physical data, standard specifications for manual and machine application, and sketches of two constructions granted four hour fire ratings. One of these is the new low-cost steel floor construction with the material applied directly to the under side of the steel. Numerous photographs.

Quiet Please!

FORMAX

the Perfect Combination

FROM START TO FINISH

ZIPPO CLOTH BUFFS

These famous long-wearing buffs run cool under all buffing conditions. High count bias-cut cloth is assembled on ventilated steel centers. Each section is perfectly balanced and faced—requires no raking.

ZIPPO SISAL BUFFS

You have a pleasant surprise coming if you haven't tried the new Zippo bias-type sisal buff. It was specifically developed for steel buffing—to blend polishing grit lines—to cut down stainless steel—and bring up a bright lustre.

BUFFING COMPOUNDS

Formax produces a complete line of buffing compounds in bar, tube and liquid form.

Our extensive manufacturing, laboratory and testing facilities are at your disposal.

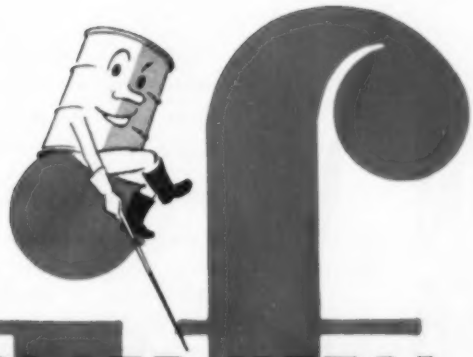
Other Formax products include the well-known C-20 Flexible Contact Wheels and F-26 Abrasive Belt Grease Stick.

Descriptive Catalogs Sent on Request

FORMAX MFG. CORP.

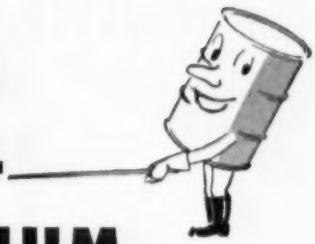
DETROIT 7, MICHIGAN

"THE FOUR McALEERS"



If

- YOU PLATE METAL
- YOU PAINT METAL
- YOU WELD ALUMINUM
- YOU STRIP ORGANIC FINISHES



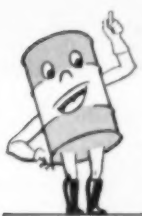
NORTHWEST'S CHEMICALS DO IT BETTER!

Northwest's years of research in formulating and perfecting analytically correct, job-adjusted cleaners are your assurance of the right chemical for your job.

Remember —YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

Northwest's Metal Cleaning Specialists have at their command such outstanding processes as LO HI pH — for cleaning prior to plating, painting or vitreous enameling; ALKALUME — for preparing aluminum for finishing and spot welding; INTERLOX — for phosphate coating; SPRA-LUBE —to control overspray of "todays" paints in water-wash paint booths; PAINT STRIPPERS — specific to your needs; SUPER-DRAW AND FLUID FILM — for drawing metals.

Northwest's production-tested chemicals and "Right the First Time" recommendations will save you money. Your Northwest Cleaning Specialist is as close as your phone.



NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

SELENIUM AREA + TYPE OF CIRCUIT DETERMINES RECTIFIER LIFE!

There has been much discussion as to what *really* determines rectifier life. Let us, from our constant analysis and study give you the facts with this typical example:

TO DELIVER 10 AMPERES . . .

a single-phase bridge rectifier requires 37.5 sq. in./arm. A three-phase bridge rectifier requires 25 sq. in./arm. A six-phase half wave rectifier with *balancing interphase transformer* requires 14.1 sq. in./arm. — therefore, circuitry determines the total selenium area.

TEMPERATURE RISE

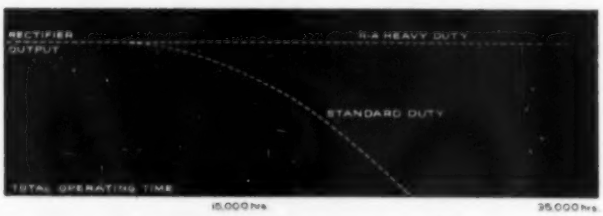
The curves are actual temperatures, recorded with and without the interphase balancing transformer — more proof of circuits versus selenium area.

Transformer Heat Rise

Selenium Cell Heat Rise

RECTIFIER LIFE

Note the lifeline of the R-A Heavy Duty Rectifier, owing to sound engineering based on constant laboratory study and countless field tests. Proof—current density, not only operating temperature, determines rectifier life.



Let us show you what the correct rectifier designs should be. Our experienced engineering staff is at your service — or write for free literature.

THE BEST IN AC-DC CONVERSION

RICHARDSON-ALLEN CORPORATION

RECTIFIER SPECIALISTS

A manufacturing affiliate of WESLEY BLOCK AND COMPANY

39-15 MAIN STREET, FLUSHING, NEW YORK

IN CANADA: Richardson-Allen of Canada, Ltd., 370 Victoria St., Toronto, Ontario

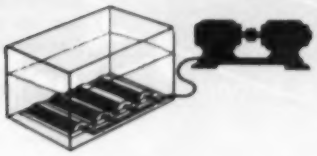
FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 645.

plating pickling cleaning

increase 2 TO 100 TIMES production

with GENERAL ULTRASONICS equipment

G.U. SONICELLS* will radiate ultrasonic vibrations at suitable intensity in any volume of liquid.
G.U. SONICELLS are welded, stainless steel, hermetically sealed, explosion resistant.
G.U. SONICELLS are safe from mechanical damage, overheating, solvent action and destruction from their own ultrasonic effects.



LARGE SCALE PRODUCTION
G.U. SONICELLS, singly or in groups, powered by reliable, time tested motor alternators, increase and improve the output of new or existing plating, pickling or cleaning production equipment.

SMALL SCALE PRODUCTION
Self contained G.U. SONICELL baths, electronically powered by G.U. Ultrasonic Generators, are ideal for pilot or small scale production and laboratory research.

SONIPLATE* PROCESS

- Better plating deposits—2 to 50 times faster.
- Eliminates anode polarization.
- Cleans during plating.
- Reduces rejects—simplifies cleaning and pickling.
- Reduces or eliminates edge build-up.

SONISTRIP* PROCESS

- Complete pickling—inside and out in 10 to 90 seconds.
- Removes rust and scale at 5 to 100 times normal speed.
- Ferrous or non-ferrous parts.

(Copper parts come out of an ultrasonic acid bath pink as a baby's bottom.)

CLEANING AND DEGREASING

- Parts are thoroughly cleaned . . . better and faster!
- Fluids can be conductive or non-conductive . . . corrosive or non-corrosive . . . hazardous or non-hazardous.

(Our SONICELLS work equally well in any desirable cleaning fluid . . . from Trichlorethylene to caustic soda.)

*TRADE MARK

GU **THE GENERAL ULTRASONICS COMPANY**

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Trade Literature

L—615. Space Savers, Parts Handlers—The Chas. Wm. Doepke Mfg. Co., Inc. announces the publication and availability of its new eight-page two-color Catalogue DN-1000, covering all products in its NesTier line of small parts handling equipment. Amply illustrated with installation photographs, the brochure also shows how an integrated, plant-wide parts handling system can be custom tailored to individual requirements using standard stocked NesTier units.

Catalog DN-1000 illustrates, describes and gives specifications for NesTier nesting-stacking boxes and baskets, rollover hoppers, hopper rack assemblies and shelf racks. Used singly or in combinations, these versatile units are designed to eliminate rehandling, simplify parts control, expedite workplace supply and recover lost floor space for productive use.

L—616. Air Circuit Breakers—A new 16-page booklet, "Selection and Application of Federal Pacific Air Circuit Breakers" has been made available by the Newark, N. J. firm. The manual gives a thorough discussion of the factors affecting the selection of the Company's DMB line of low voltage air circuit breakers.

A complete description of Federal Pacific Electric Company's DMB breakers includes special sections on Federal Pacific's unique tripping device, as well as charts of time-current curves.

Each of U. S. Stoneware's many products for platers has been developed with two thoughts kept constantly in mind: (1) to lower plating costs, (2) to improve plating quality.

Designed and developed by engineers and chemists expert in the selection and use of corrosion-resistant materials, "U. S." products for platers have been field-tested, field approved.

Feel free to consult U. S. Stoneware plating specialists without obligation. Their rich background of experience may be of help in solving many of your plating and finishing problems.

Engineers, Manufacturers, Erectors of Corrosion-Resistant Equipment Since 1865

Visit Booth 111
INDUSTRIAL FINISHING EXPOSITION
Cleveland, Ohio
June 20-23

PLASTICS & SYNTHETICS DIVISION
U. S. STONEWARE
Akron 9, Ohio

465C-1

L—617. Timers—A 5-page brochure with current information describing the standard line of electronic timers manufactured by G. G. Wilson & Co., West Virginia is now available. Included in this line are delay, repeat cycle, and interval timers all of which are available from stock.

L—618. Controller Bulletin—New 12-page bulletin, 5A-13, just issued by The Foxboro Company, Foxboro, Mass., describes in detail the company's new Model 41A Pneumatic Indicating Controller, replacing the earlier Model 41 for control of process variables such as temperature, pressure, liquid level and humidity.

New design features are fully explained, with emphasis on the longer, more readable indicating scale, extensive use of high quality control components, and simplified maintenance.

L—619. Indicating Tachometers—Small, rugged electric tachometers for practically any production control, speed indicating, or checking application, are fully described in a new 20-page Bulletin 540 available from the Electric Tachometer Corp., Philadelphia, Pa.

L—620. New Pump—A descriptive leaflet giving all the facts about the newly designed Vanton X-B Pump has just been released by Vanton Pump and Equipment Corp., Hillside, N. J. Design information, capacity chart, maintenance hints and application data are included. Its no stuffing box, no shaft seal construction, plus the fact that all bearings are permanently protected from fumes or chemical attack make the X-B Pump ideally suitable for handling severe corrosive chemicals and abrasive slurries.

L—621. Efficient Feed—A 24-page booklet entitled: "Time, The Important Fourth Dimension of Production and Profits" has just been released by Lipe-Rollway Corporation. Demonstrates how the company's A.M.L. pneumatic bar feed, by keeping pace with time, feeds bar stock continuously into single spindle screw machines, turret lathes, centerless grinders, abrasive-wheel cut-offs, punch presses, cold headers, die machines and other equipment for periods up to 8 hours. Booklet also shows how this automatic production overcomes such inefficiencies as cutting air, stock loading by hand, excessive operator fatigue, slow set-ups, and high reject rates.

L—622. Plastic Pipe and Fabrications—Atlas Mineral Products Company, Mertztown, Penna. has recently completed the publication of an eight-page bulletin on rigid plastic fabrications and pipe. The bulletin outlines the use of Type I polyvinyl chloride in the fabrication of exhaust systems, process equipment, and processing tanks. Resistance characteristics and physical properties of the plastic are included in the section.

McGEAN BRIGHT NICKEL

Dependable • Easier to Maintain • Versatile

features

Simple control:

Complete methods are available for "on the job" analyses of each bath constituent. Liquid addition agents are easily added.

Less bath maintenance:

Exceptional tolerance to metallic and organic impurities results in less frequent bath purification treatments.

Wider plating range:

Extreme flexibility allows successful operation over wide ranges of solution composition and plating conditions.

Easier chrome plating:

Active nickel deposits provide surfaces which readily accept chromium plating.

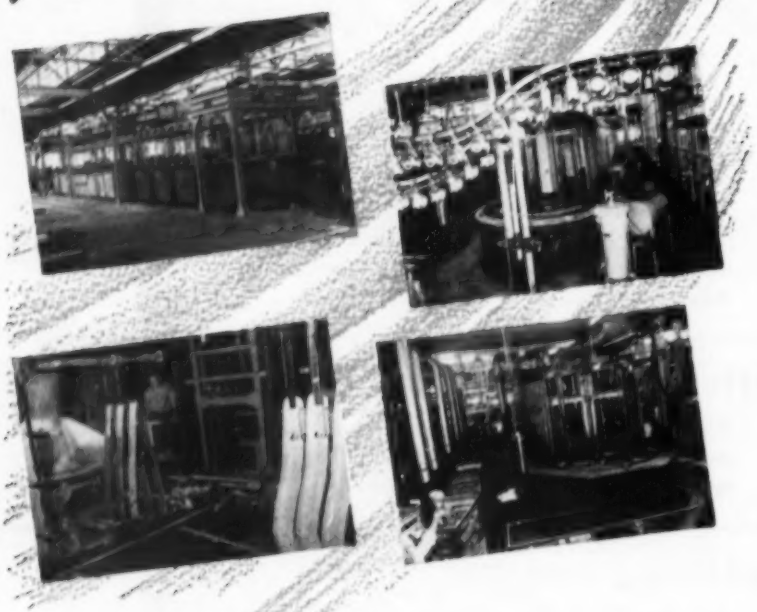
The McGean Chemical Company—1040 Midland Building—Cleveland 15, Ohio

dependable manufacturer of anodes and electroplating chemicals

McGEAN

MEAKER

Automation...



The Key to Successful High Speed PLATING

- Higher Production
- Versatility
- Economical Operation
- Better Finish

Automation by MEAKER is the sure way to more successful plating, anodizing, phosphatizing and other processing operations — at higher speeds — thus lower cost. MEAKER builds automatic plating equipment especially to fit your operation, whatever it may be.

Let us know about your problem and ask to have a MEAKER engineer study it and make recommendations at no obligation.

MEAKER PRODUCTS

THE MEAKER COMPANY

1633-41 SOUTH 55th AVENUE • CHICAGO 50, ILLINOIS

Phone OLympic 2-2110

Trade Literature

Also included in this comprehensive bulletin is a section on plastic pipe and fittings. Description and tables on chemical and physical properties of Type I and II polyvinyl chloride and styrene copolymer rubber resin blend rigid plastic pipe is included.

L—623. Plastic Caps and Plugs—A new 4-page catalogue listing available sizes and specifications of Shurclose Caps and Plugs is now available from Ray A. Scharer and Co., Detroit, Mich.

It contains description of uses: Protecting, sealing or masking of tubing, fittings, valves, hydraulic components and machined parts. Dimensional information covers 5 types of rubber and 2 types of plastic caps and plugs.

L—624. Pfizer on Itaconic Acid—A 20-page, paper bound, index-type technical bulletin outlining the uses and properties of itaconic acid, a versatile organic compound made in commercial volume by fermentation, has been published by Chas. Pfizer & Co., Inc.

Charts, molecular structure, reactions, polymerization, patents and packaging and shipping data are included in the firm's Chemical Sales Division booklet No. 82.

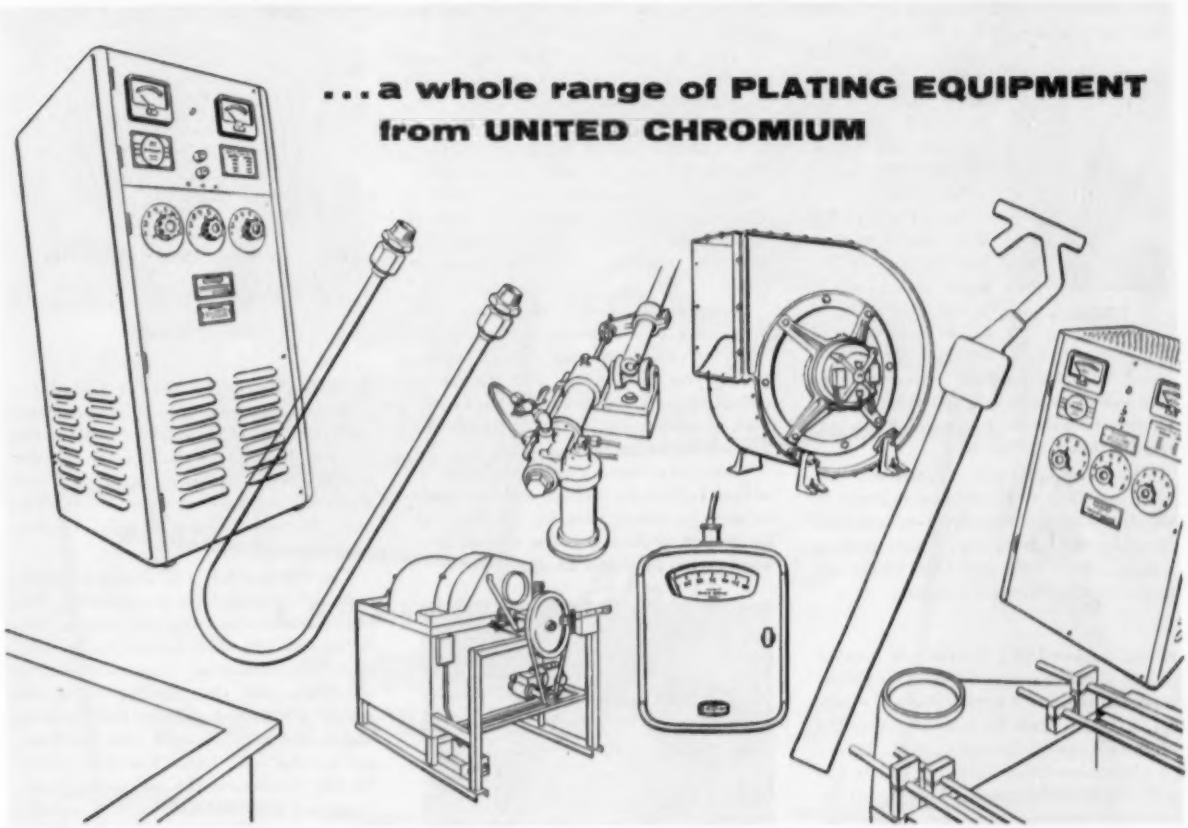
The chemical and physical properties of itaconic acid suggest its potential value as an intermediate in the preparation of pharmaceuticals, dyestuffs and other complex organic compounds. Derivatives of the compound may be used in the preparation of plasticizers, polyester resins and as comonomers in the production of many useful polymeric materials.

L—625. Applications For Metalphoto Process—A comprehensive four-page report, detailing the technical aspects as well as new applications for the Metalphoto process of photographic reproduction, on photosensitive aluminum plates, is now available from the Metalphoto Corporation, Cleveland, Ohio.

The free literature illustrates and describes the Metalphoto manufacturing process and covers in detail, the formation and structure of the anodized layer of the plates in which the legend to be reproduced is imbedded.

L—626. Steam Trap 60 Day Trial Offered—Revised bulletin No. 255 describes the revolutionary new Sarco Thermodynamic steam trap and explains why practically no maintainance is required. A 60 day trial offer is printed on a tipped-in card. Two-color, 4 page bulletin lists 13 features of the Thermodynamic steam trap, such as: only moving part is a solid stainless steel disc, no valve mechanism used, closes tight on no load, same head and seat for pressures to 600 psi.

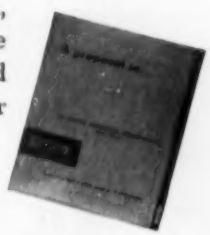
Designed to give you economy and efficiency in plating



Whether you need one new piece of equipment or a complete installation . . . here's good news for you. The Unichrome name can now be found on *equipment*, too.

That means plenty to platers who have known the kind of time- and money-savings which United Chromium's help makes possible. It means equipment that's right for the job . . . for longer service . . . and for substantial savings that go on year after year.

Ask us for a proposal. We'll be glad to survey your requirements in tanks, rectifiers, anodes, agitators, heating coils, temperature controllers, blowers, and all the other necessities for your operation.



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for better plating at a better profit

UNITED CHROMIUM, INCORPORATED

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Detroit 20, Mich. • Waterbury 20, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada: United Chromium Limited, Toronto 1, Ont.

Equipment & Supplies

Please use Reader Service Card for all items in this section

E—627. Diodes—International Rectifier Corporation, El Segundo, Calif., has announced the availability of its new germanium diffused junction power diodes, which offer exceptionally low leakage and high rectification efficiency.

Efficiency Plus!

Reliability is featured in the design of these diodes as a result of complete hermetic sealing of the housing, consisting of glass-to-metal and welded metal-to-metal seals throughout. Freedom from contamination and long operating life are assured because no solders of fluxes are used in their construction.

This technique and construction has been the subject of considerable study in the International Rectifier Research and Development Laboratory. Standard types such as 1N91, 1N92 and 1N93 diodes are now available from production.

E—628. Anti-Slip Ferrox—A nonskid plastic abrasive composition called Ferrox is now available for a wide range of safety applications. Made by American Abrasive Metals Company, Irvington, N. J., Ferrox provides low-cost coverage, 40 feet to the gallon and costs one-third as much as fabric-backed floor coverings. Goes down fast—just open the can and trowel it on. Ferrox insures nonslip grip, resists oil, chemicals and weather conditions. Especially suitable for concrete floors in washrooms, ramps, platforms, around machine areas or wherever there is a slipping hazard.

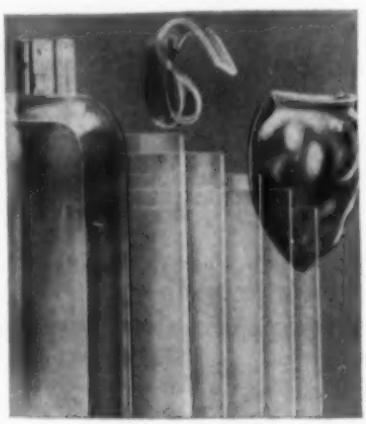
Non-skid Wonder

E—629. Automatic Clamping Hook Barrel Truck—A new barrel handling truck, which is said to require no tipping or pick-up space when handling barrels touching each other, has just been announced by Valley Craft Products, Inc., Lake City, Minn.

Designated Valley Barrel Cart Model 600, it is equipped with an automatic spring actuated bar that allows a hook to slip over the barrel edge as the truck is moved against the barrel without the operator touching either the hook or barrel.

Heavy barrels stored in contact with each other can be easily loaded on the truck by a single operator without moving them apart because of this automatic clamping hook. Special design of the loading shoes provides easy tipping of the heaviest barrels.

These same features make it possible to unload barrels for storage without space between by merely releasing the barrel at the desired location as barrel slips off shoe when cart is tipped forward.



Clean and Tough

E—630. Thermoplastic Dura-Lite—Opening new fields for use of clear plastics and providing improved performance for many present applications, new thermoplastic Dura-lite is now manufactured in sheets by The Homalite Corporation of Wilmington, Del.

Dura-lite is outstanding for its high abrasion resistance—five times that of ordinary methacrylate. It resists crazing and is immune to most corrosive chemicals. Completely formable and machinable, it also withstands severe weather conditions.

Its flexural strength being nearly twice that of methacrylate, and its tensile and impact strength also improved, Dura-lite is particularly valuable where difficult bends and forming operations are encountered or where crazing is a problem.

Sturdy Grinder

E—631. Tool and Cutter Grinder—Increased capacity, up to 22 inch diameter cutters, is one of the improvements in the Sterling RK-2 Tool and Cutter Grinder announced at the Western ASTE Show where the machine was shown by McDonough Manufacturing Company, Wisconsin.

The Sterling RK-2 is designed specifically for grinding tools and cutters. The heavy antifriction tables required on Universal Grinders, such as the Sterling G-2, have been eliminated. Instead of moving the work past the grinding wheel the spindle is mounted on linear ball bushings and moves past the work on a hardened and ground steel bar. The usual workholding fixtures, workhead, centers, etc., mount on a column that moves vertically and in and out.

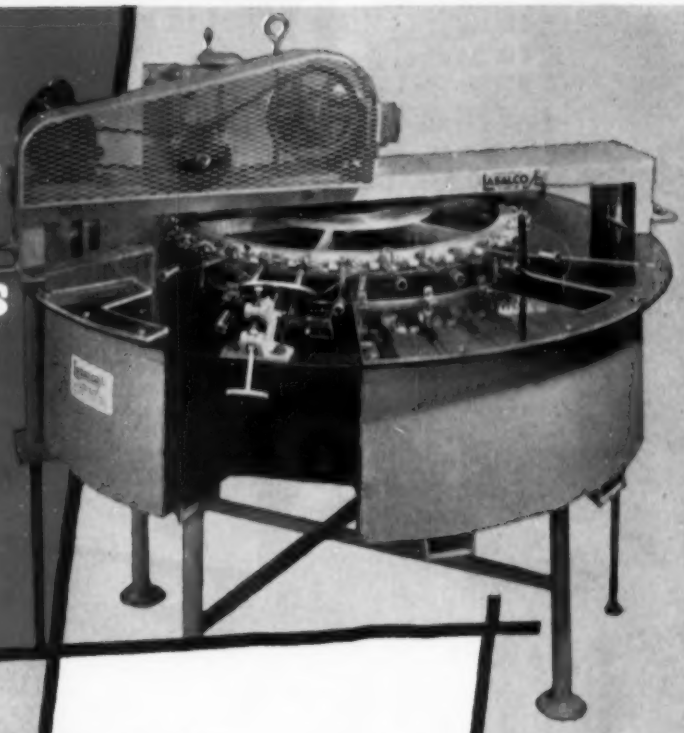
The result is said to be a much more compact machine that is easier to set up because all controls are grouped in easy reach from the front of the machine and easier to operate because relatively little weight is moved.

The radically different design of the Sterling RK-2 makes it possible to provide a machine with complete versatility and greater capacity than a Universal Grinder at about one-half the cost.

E—632. Speed Reducer—Ohio Gear Co. announces a new small redesigned, horizontal DOX double reduction speed reducer with zinc alloy housing, affecting a 10 per cent saving on current selling prices. The DOX is available in ratios of 4:1 to 1630:1. Torque capacities of 25 inch pounds to 150 inch pounds utilizing 1/6 hp.

Double Reduction

Chrome Plate over 3200 Pieces Per Hour with One Operator!



LASALCO's *New* CIRCULAR CHROME PLATER

Cost-cutter . . . time-saver . . .
production-booster! Consider the unusual extra profit possibilities with this new high current density, continuously-moving cathode chrome plater:

- Exceptionally high output—3290 pieces, up to 3" long, per hour at 23 seconds. Minimum output, 530 pieces per hour at 2.39 minutes. (Alternate slower drives for heavier plating.)
- One-man loading . . . fully automatic unloading.
- No racks . . . no rack upkeep.
- Easily removable sectionalized cover of Plexiglas, plus easy-to-raise driving mechanism and cathode wheel, gives quick access to coils and anodes. Parts falling into tank are instantly recoverable.
- Simple installation requires only electrical connections and exhaust duct. Plater delivered complete, ready to install.

Write Now . . . Get The Facts About This Money-Maker

SPECIFICATIONS

Cathode Wheel Diameters 30". 31 Bronze Work Carriers 3.24" O.C.
Effective Plating Travel 68.4".
Inner Anode Diameter 24"; Outer Anode 40".
Center Of Anode To Cathode 4".
Tank Diameter 54"; Depth 14".
3/32" Koroseal Lining.
Solution Capacity 115 Gals. 2" From Top.
Anodes: Flat 16 lb. 6% Antimonial Lead—Outer ¼"x9"x7'1"; Inner ¼" x 9" x 4'4". Anode and Cathode Taps ¼" x 2". Copper Bars.
Bused For 500 Amps.
Heating (Standard): ½" I.D. 6% Antimonial Lead Steam Coil. (Available For Electric Heating.)
Drive: ¼ HP 110/220 1- Phase 60 Cycle AC Motor. Variable Speed Reduction.

LASALCO, INC.

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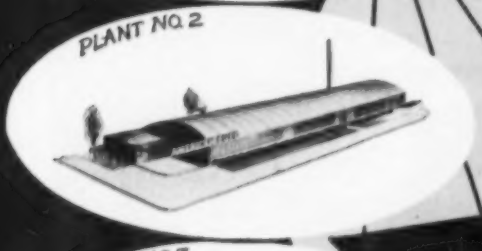
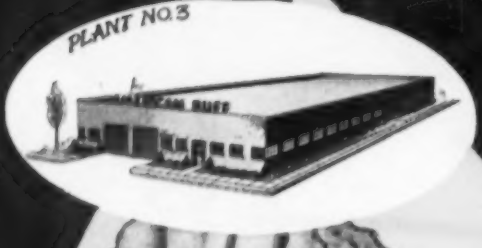
2820 LaSalle St. • St. Louis 4, Mo.
PRospect 1-2990

IN TEXAS
501 West Eighth St. • Irving (Dallas), Tex.
Phone: 3-4921

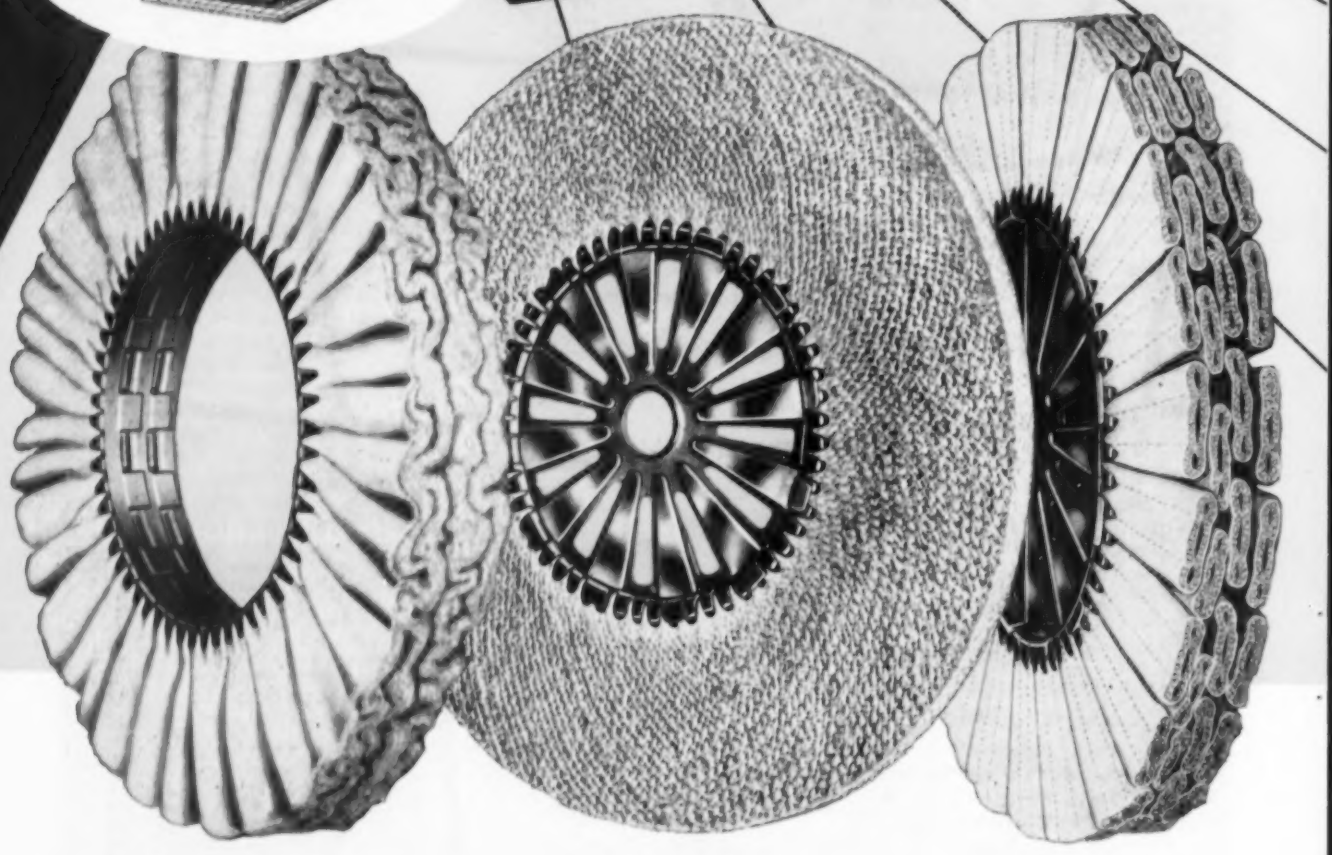




For the

Engineered to do MORE buffing Jobs BETTER!

From the world's largest buff manufacturing plants come the world's finest buffs! Every American Buff is carefully planned to answer the specific problems of the industry . . . expertly produced of the finest quality materials and workmanship. For variety to meet every need . . . for top performance . . . for outstanding economy . . . choose AMERICAN —you can't buy a better buff!



Automatic BIAS BUFF

This versatile buff does both cutting *and* coloring on a wide variety of metals. Like other American "Automatic" buffs, it features the patented *Centerless* construction with exclusive "Pre-Assembly". Also available with permanent steel or fiberboard centers.

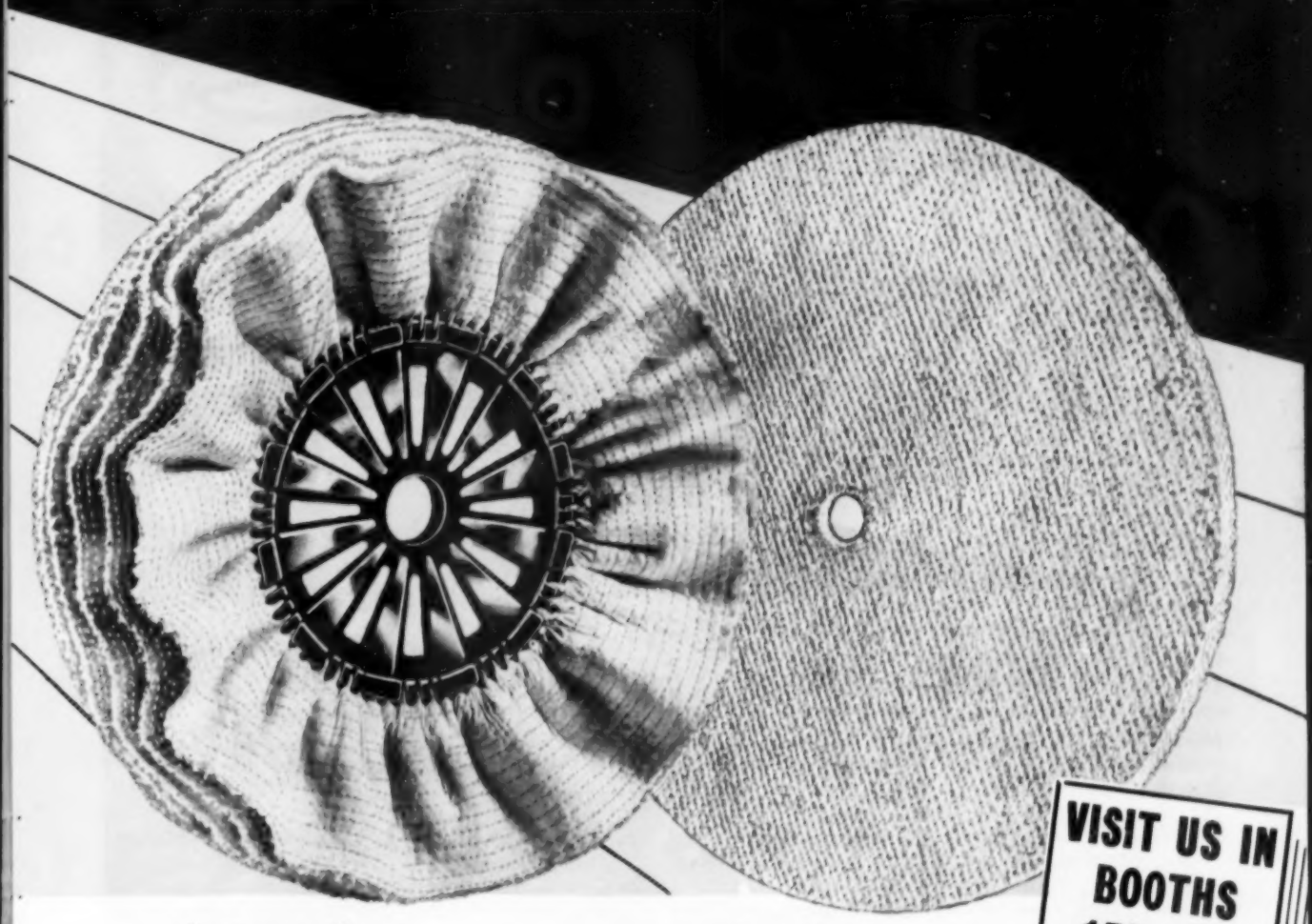
Automatic BIAS SISAL BUFF

Top-quality *all-new* sisal gives this buff unmatched durability and fast cutting. Exclusive "permanizing" process actually *locks fibres together* . . . eliminates scratching and fraying. Available in Centerless model or with Permanent Center.

Automatic UNIT SISAL BUFF

Extra-flexible for fast cutting and finishing on contoured surfaces. Sisal "units", cloth wrapped to prolong wear, follow every crevice and variation in shape. Air-cooled *unit design* prevents burning or discoloration, even at high speeds. In Centerless or Permanent Center types.

Job that's TOUGH...
use an
AMERICAN BUFF !



Automatic
"OPEN" BIAS SISAL BUFF

Ruffled face eliminates troublesome streaking. New, exclusive "open" design combines the best features of both Bias Cloth and Bias Sisal buffs for fast cutting and high lustre finishing. Made of top-grade "Permanized" sisal, with or without cloth layers—in air-cooled Permanent Center construction.

Conventional
SISAL BUFFS

Top-quality "Permanized" sisal, in a variety of constructions: All-Sisal for even finish; Sisal with Cloth for long wear; Sisal with Krinkle-Kraft Paper for extra-sharp cutting; and Custom-Treated Sisal, for harsh or soft cutting to meet your specific needs.

VISIT US IN BOOTHS 155, 157 Industrial Finishing Exposition

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AUTOMATIC BUFF COMPANY Division of

American Buff Company

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New Jobs
for the World's
Most Useful
Metal
—*Straits Tin*

Tin mining in Malaya. Here a test boring is being removed.

New tin-alloy platings improve products, cut costs

The number of new ways you can use Straits Tin to make better products at lower cost is today growing faster than ever, and lower cost means higher profit.

New tin-alloy platings, for example, are giving increased protection against corrosion to steel.

Tin-zinc and tin-cadmium platings have been found to be many times as resistant to corrosion as either zinc or cadmium alone.

Tin-copper electrocoatings are increasingly useful. Red bronze can now be used as a more durable undercoating for chrome—white bronze for applications similar to those of silver plate.

And because tin is as handsome as it's hard working, a new tin-nickel alloy is proving itself a more attractive, more corrosion-resistant decorative plating than the conventional chromium on nickel copper.

New plating alloys represent just one of the ways Straits Tin can do more for you today.

Over a third of the global tin output is mined and smelted in Malaya. Known as Straits Tin, this metal is over 99.87% pure, and is world-famous for its absolute reliability of grade.

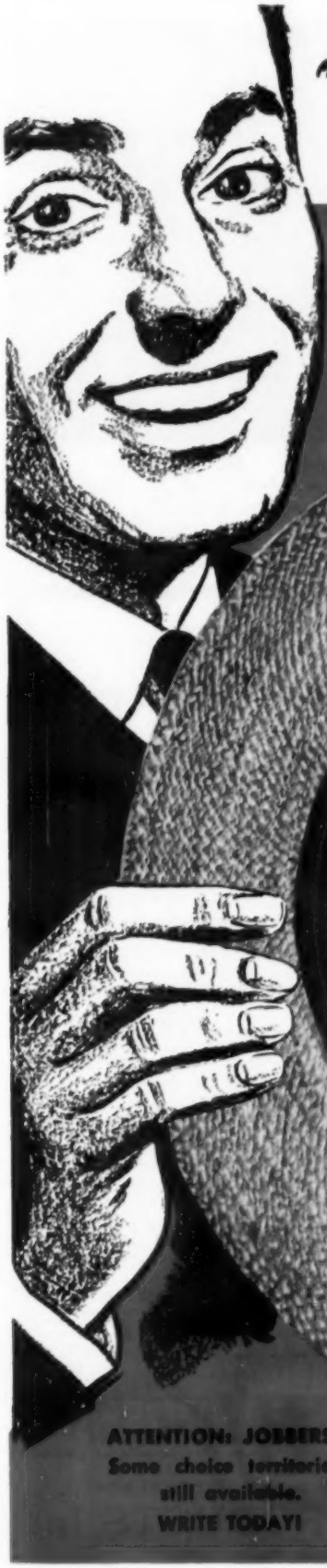
Whether you're planning a new product, working to improve an old one, or simply seeking ways to avoid the squeeze between rising manufacturing costs and resistance to higher product prices, a careful reappraisal of the properties of Straits Tin may uncover a profitable answer to your problem.

Write now for any information you may need about versatile, plentiful, economical Straits Tin.

A copy of our new booklet on Straits Tin is yours for the asking.

MALAYAN TIN BUREAU

THE MALAYAN TIN BUREAU
Dept. 7, 1028 Connecticut Ave., Washington 6, D. C.



"Why accept imitations when the original costs no more!"

JOE-D Specialists in SISAL BUFFS!

Holders of the original patent on Bias Sisal Buffs — U. S. Pat. No. 2642706

It took specialized "know-how" to conceive and create the first patented Bias Sisal Buff! And that same knowledge has been steadily enlarged and improved by the ablest, most experienced staff in the business—concentrating on this type of buff. Today, our modern, efficient plant proudly produces buffs that meet the most exacting requirements of the metal finishing industry. Always insist on *original* quality. Specify JOE-D—America's *finest* Bias Sisal Buffs.

The JOE-D line covers a complete selection of Bias, Bias Spoke (Finger), and Conventional Buffs — as well as quality Polishing Wheels.

ATTENTION: JOBBERS! Some choice territories still available. WRITE TODAY!

the JOE-D Buff Company

SANDWICH, ILLINOIS • TELEPHONE 2171

Equipment & Supplies

The DOX is especially adaptable to food market conveyors of all kinds, domestic stokers, animated displays, farm spreaders, pump drives, barbecues, light industrial applications, and home work shops.

These standard DOX reducers are furnished with roller bearings. Bronze sleeve bearings are also available, where applications permit, with further savings worth considering.

Sure Spray

E—633. Low Pressure Spray Gun—Model P-300 is the newest addition to the spray equipment group offered by the John B. Moore Corporation, producers of solvents engineered for safety, emulsion cleaners and corrosion inhibitors. P-300 is an air operated siphon paint spray gun, designed to operate on air pressure as low as 5 lbs psi. It is light in weight and draws from a one quart cut.

The unusual features of P-300 permit its use for such things as stripe painting, touch up work, stencil ink spray in shipping rooms, applying silicone mold release oils, and application of metal surface corrosion inhibitors.

E—634. Cell Transmitter—Major advances in design have been incorporated in a new force balance flow transmitter recently announced by The Foxboro Company, Foxboro, Mass., as an addition to its line of differential pressure flow measuring instruments. Designated the 13A d/p Cell Transmitter, it measures differential pressures and transmits a 3–15 psi signal to a receiving, recording or controlling instrument. The new transmitter provides continuous adjustment over the entire range of 0–50 inches to 0–250 inches of water differential without change of parts.

Foxboro's Finest

E—635. Roto-Mite—Development of a unique and semi-automatic mechanical finishing machine for finishing a wide variety of parts in a relatively short time cycle is announced by Roto-Finish Company, Kalamazoo, Mich., manufacturer of precision finishing equipment. Called the "Roto-Mite," the new machine is designed primarily for small lot production or experimental work.

The machine is designed with a removable tub in which finishing mass is contained and rotated. This feature allows use of several tubs with different type masses. Tubs can be changed quickly to allow change-over from one operation to another. Each tub is a complete unit with built-in sludge removal system. Removal of the tub does not require any modification or adjustment of the driving mechanism as the drive is a separate unit on which the tub is mounted. Another important feature of the new Roto-Mite

For Finer Finishing

is a variable speed drive which further increases its versatility.

SAVE with ENLEY . . . Get Your

Demineralized Water

Without Regeneration

at 2¢—4¢ per Gallon

YOU can't beat the new Enley PERMA-DEMON for low initial cost and low per gallon cost. Improved manufacturing methods, reduced overhead and the radically new designed PERMA-DEMON all combine to bring you Demineralized Water at lower cost per gallon than can be obtained from any unit of comparable size.

The PERMA-DEMON is the only Water Demineralizer of its size that does not require Cartridge Replacement by the Manufacturer. It performs with the same economy as any larger Cartridge Type Demineralizer. Available now.

AT THE AMAZINGLY LOW COST OF ONLY $17.95 Complete

Comes packed with built-in carborundum porous stone filter and fiberglas screen.

SPECIAL FEATURE: The ion-exchange material can easily be removed and the PERMA-DEMON refilled with fresh material which can be obtained at the lowest net cost anywhere.

CHART BELOW EXPLAINING COST PER GALLON

mineral content parts per million (as $CaCO_3$)	output-Gallons per refill (1 pound of material)	cost per gallon per lb. of material —in cents
50	210	1.4c
100	102.5	2.75c
150	69	4.0c

based on material costing $3.25 per lb. and credit of 50c per lb. for exhausted material returned to Enley Products Inc. NET COST OF MATERIAL $2.75 per lb.

Other units available of larger resin capacity at comparable prices. Write for full details.

FULLY GUARANTEED

We Guarantee our products to perform as advertised or we refund your money.

FOR PROMPT DELIVERY ORDER NOW!

ENLEY PRODUCTS, Inc.

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GLO-QUARTZ*

ELECTRIC IMMERSION HEATERS

for

All Metal Finishing Tanks

available in

Impervious Graphite

Translucent—Transparent Fused Quartz

Steel—Copper—Stainless Steel

All Sizes—All Voltages

One and Three Phase

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CLEVELAND, OHIO JUNE 20-21-22-23, 1955

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*TRADEMARK REG. U. S. PAT. OFF.

GLO-QUARTZ ELECTRIC HEATER CO., Inc.

WILLOUGHBY, OHIO

SEE Industrial's AT THE A.E.S.

COMPLETE WASTE TREATMENT SYSTEMS

- **PROFITABLE RECOVERY OF VALUABLE ACIDS AND METALS.**
- **LOW COST DESTRUCTION OF CORROSIVE AND TOXIC MATERIALS.**

SEE A WORKING MODEL OF A CHROMIC ACID RECOVERY SYSTEM

In our booth you will see why Industrial's Ion-Exchangers can pay for themselves in a few months. Besides the value of the chromic acid recovered, the continuous operation eliminates down time for replacement of solution and simultaneously produces a high quality of purified water.

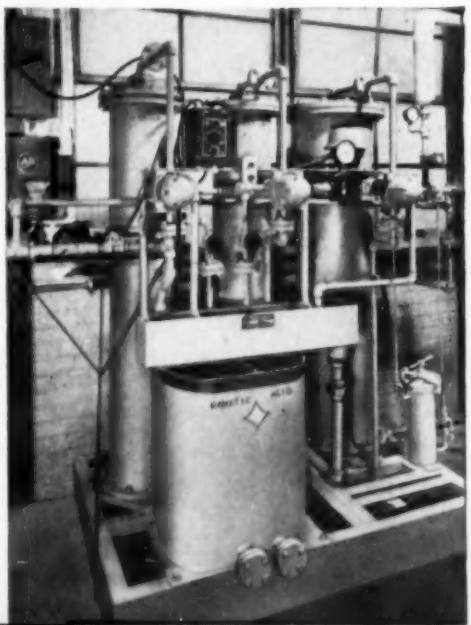
The unit at the right is used by the Sunbeam Corporation for recovery of gold and nickel from plating rinses . . . and is only one of the many ways to *profitably* treat acid wastes. In many cases treatment of process solutions with Industrial ion-Exchangers will prevent their becoming waste.

SEE WORKING MODEL OF CHROMIC ACID DESTRUCTION SYSTEM

Where recovery is not economically practical . . . Industrial's *completely packaged* destruction systems are recommended. These units produce non-toxic waste water at the lowest possible cost. In addition to chromic acid, a wide variety of harmful wastes can be treated with Industrial systems. They cost little to operate and can be designed for continuous automatic, semi-automatic and manual operation.

These are only two of the many waste treating systems Industrial designs and builds to suit the job.

GET FULL DETAILS ON INDUSTRIAL'S COMPLETE SERVICE



Industrial

INDUSTRIAL
FILTER & PUMP MFG. CO.
5924 Ogden Avenue • Chicago 50, Illinois

CENTRIFUGAL PUMPS
PRESSURE FILTERS
DEMINERALIZERS
ION EXCHANGERS
HEAT EXCHANGERS
RUBBER LININGS
WASTE TREATING EQUIP'T

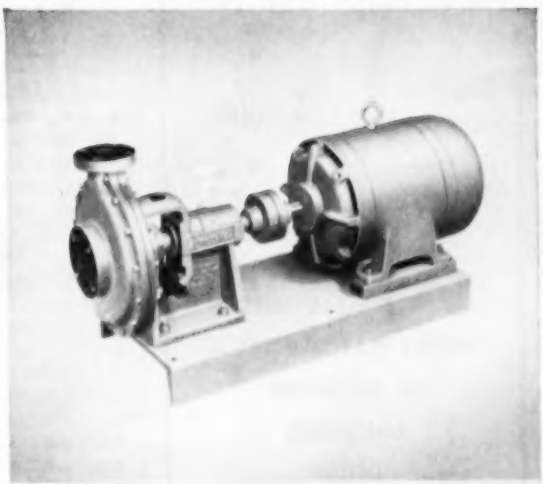
NEW EQUIPMENT
CONVENTION IN CLEVELAND

NEW IMPROVED CENTRIFUGAL PUMPS...
CUT-AWAY WORKING MODELS

See how Industrial protects pumps from corrosion with thick permanently bonded rubber linings... and a corrosion-proof stuffing box. These pumps are designed specifically for rubber lining and are built and lined entirely at Industrial. By having its own rubber division, Industrial is able to compound the exact formulas of rubber and synthetics best suited to resist the corrosive fluids used in the plating industry.

See how Industrial beats vibration problems with its precisely balanced rotating unit... a very short thick shaft to prevent oscillation... and large combination radial and thrust ball bearings which are permanently lubricated.

Industrial's rubber lined pumps offer a far wider range of use than any metal pumps. Our engineers will be glad to give you full data on resistance to corrosive and abrasive materials of all kinds.



SEE THE LUCITE WORKING MODEL OF
INDUSTRIAL'S NEW HORIZONTAL FILTERS

These HORIZONTAL filters will set a new standard of convenience and performance for the plating industry.

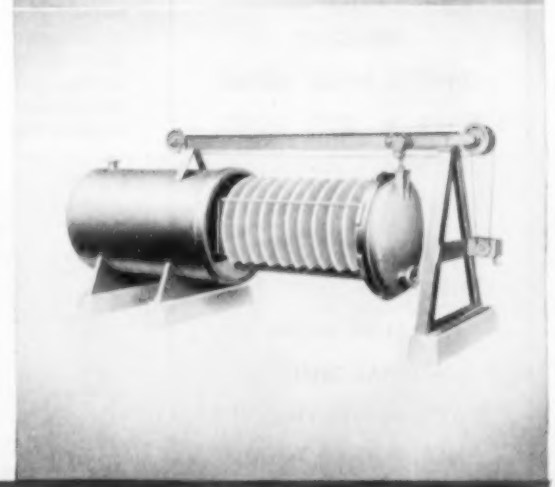
In our transparent model you will actually see the uniform buildup of cake on the filter leaves.

You can see how the head, leaves and manifold run out on a track for exceptionally easy recovery of wet or dry cake discharge.

When the filtration unit is out of the shell, take a look at the "lift out" filter leaves which simply snap in and out of place on the manifold, using an O-ring as a seal.

A rapid cleaning feature is available in the form of a vibrator for shaking off the filter cake.

Capacities from 10 to 1950 square feet of filtering area . . . and Industrial filters can be made in a wide range of materials or lined to suit your needs.



... AND OTHER PRODUCTS INTRODUCED TO THE PLATING INDUSTRY FOR THE FIRST TIME.

Industrial WILL BE IN BOOTH NO. 220
CLEVELAND PUBLIC AUDITORIUM
JUNE 20th THRU 23rd

for complete

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CROWN FULL AUTOMATICS

PROMAT PLATING PROCESS

GE RECTIFIERS

UNICHROME

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BUFFS • BUFF LATHES

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LEA GREASELESS

INDUSTRIAL FILTERS

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HONITE BARREL FINISHING

HEIL PLATING TANKS

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Equipment & Supplies

Practical Portable

E—636. Portable Metal Band Saw—An electric metal-cutting band saw that is not just movable but completely portable has been introduced by the Porter-Cable Machine Company of Syracuse, N. Y. The new Model 524 Porta-Band Saw weighs only 16 lbs, is scarcely larger than a hand hack saw, and is 15 times faster by actual test. It is said to be the only metal-cutting saw ever made that is fast and light enough to be used free-hand in any position. The 524, with a stock-cutting capacity up to 3¼ inches by 4¼ inches, is equal to a large hack saw. Equipped with a powerful motor, this compact machine eliminates fatigue, makes a cleaner, more accurate cut, and saves hours of time on jobs that formerly had to be done by hand. Even inexperienced workers can cut ferrous and non-ferrous metals, plastics and other problem materials with greater speed and accuracy.

E—637. Magnetic Conveyors—Close grouping of machines to save floor space and increase automation is possible with Homer "Space Saver" Magnetic Conveyors, a product of The Homer Manufacturing Co., Inc., Lima, Ohio.

Moving Magnets

Because they convey ferrous pieces and parts such as nuts, bolts, nails, washers, tin cans, bottle caps, stampings, etc., up to inclines as steep as 90°, Homer space saver magnetic conveyors eliminate long conventional conveyors with gradual inclines. As a result, production machinery can be placed much closer together, making available valuable floor space for extra capacity. Another time saving application of Homer magnetic conveyors is removing scrap from receiving pits, made possible because they will pick up ferrous pieces from floor level.

Available for Immediate Shipment, Attractive Values

THE FOLLOWING EXCELLENT REBUILT AND GUARANTEED ELECTROPLATING MOTOR GENERATOR SETS AND RECTIFIERS, WITH FULL CONTROL EQUIPMENT:

PLATERS

1—7500/3750 AMPERE, 9/18 VOLT, **HANSON-VAN WINKLE-MUNNING**, Synchronous.
1—5000/2500 AMPERE, 6/12 VOLT, **CHANDEYSSON**, 25° C., Synchronous, Exciter-in-head.
1—4000/2000 AMPERE, 6/12 VOLT, **CHANDEYSSON**, 25° C., Exciter-in-head.
1—3000/1500 AMPERE, 6/12 VOLT, **COLUMBIA**, Synchronous.
1—2500/1250 AMPERE, 8/16 VOLT, **ELECTRIC PRODUCTS**, Synchronous, Exciter-in-head.
1—2000/1000 AMPERE, 9/18 VOLT, **ELECTRIC PRODUCTS**.
1—1500/750 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING**, Synchronous, Exciter-in-head.
1—1500/750 AMPERE, 12/24 VOLT, **CHANDEYSSON**, Synchronous, Exciter-in-head.
1—1000/500 AMPERE, 6/12 VOLT, **ELECTRIC PRODUCTS**.

ANODIZERS

1—4000 AMPERE, 40 VOLT, **CHANDEYSSON**, Exciter-in-head.
1—1000 AMPERE, 40 VOLT, **CHANDEYSSON**, 25° C.
1—1000 AMPERE, 30 VOLT, **IDEAL**, Exciter-in-head.
1—750 AMPERE, 60 VOLT, **HANSON-VAN WINKLE-MUNNING**, Synchronous, Exciter-in-head.
1—500 AMPERE, 25 VOLT, **CHANDEYSSON**, Synchronous, Exciter-in-head.
1—400 AMPERE, 40 VOLT, **M. G. C.**, Exciter-in-head.

RECTIFIERS

1—2000/1000 AMPERE, 6/12 VOLT, **G. E.**, COPPER OXIDE, with Manual Control.
1—2000/1000 AMPERES 6/12 volt G. E. brand new selenium stacks, with "On-load" Automatic Voltage Regulator.
1—**GREEN SELECTOPLATER**, 1800 AMPERE, 12 VOLT, 220/3/60.
2—**UDYLITE-MALLORY**, 1500/750 AMPERE, 6/12 VOLT, Control.

SPECIAL

1—20' x 4' x 3' H-VW-M Semi-Automatic for nickel.
1—**RANSOHOFF** SPIRAL HOT AIR DRYER.
1—**CROWN** 2-COMPT. HORIZONTAL DE-BURRING MACHINE, each compt. 20" x 36", Unlined but can be lined.
2—**CROWN** CENTRIFUGAL DRYERS, Size No. 1 and Size No. 2, Steam Heat.
1—Production Pipe Polishing Machine, Model 101, Motorized.
2—**RONCI** Enamelers, No. R-100, and No. R-200.
1—**K-4** SEMI-AUTOMATIC BUFFING MACHINE.
3—**U. S.** ELEC. TOOL, Mod. 110, TWIN 15HP POLISHING LATHES.
1—MODEL "A" PRESSURE BLAST.

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BULLETIN 255

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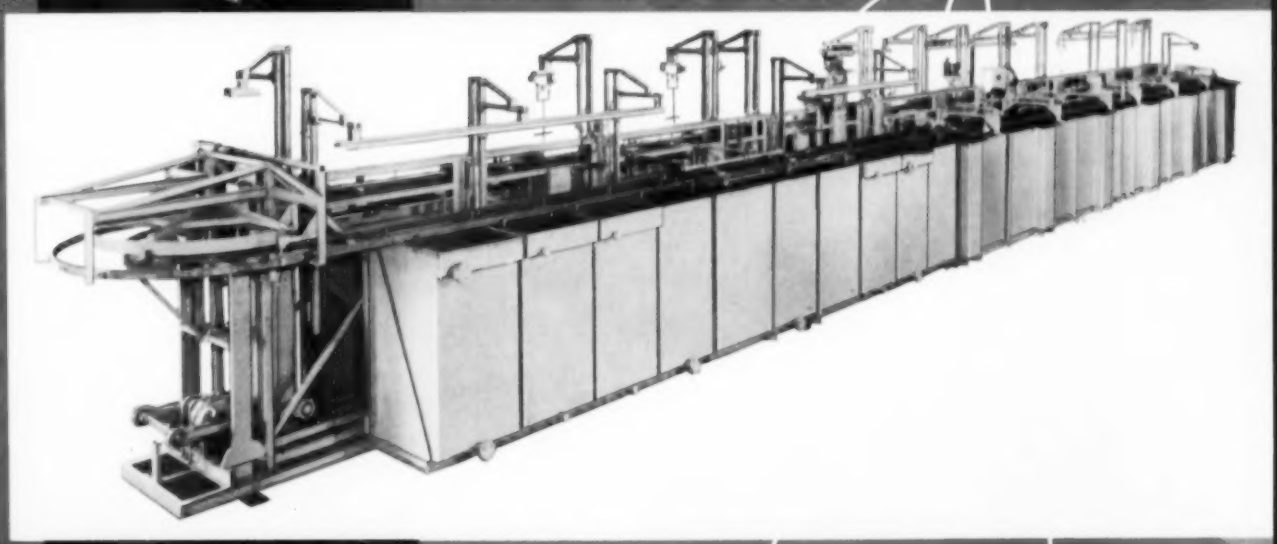
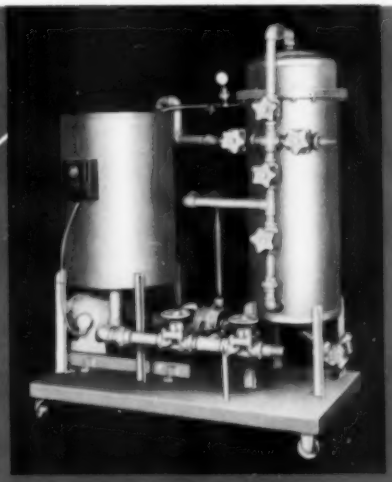
automatic plating equipment and supplies





RECTIFIERS
AUTOMATICS
SEMI-AUTOMATICS
FILTERS
TANKS & LININGS
ANODES
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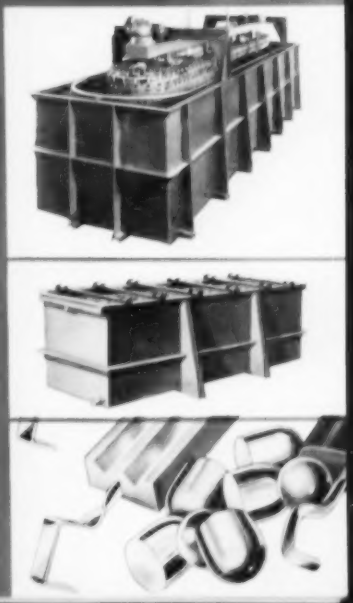

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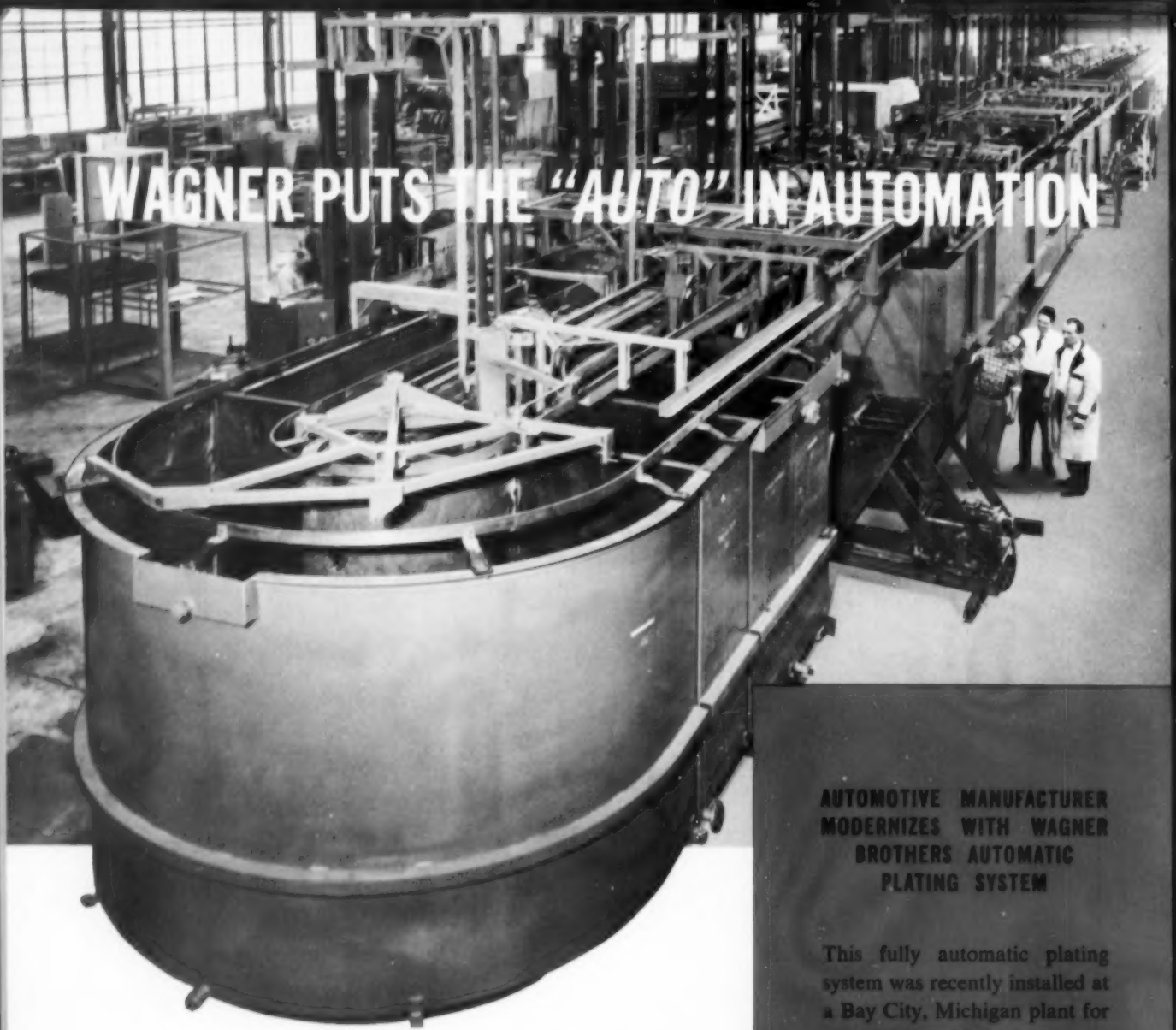
WAGNER PUTS THE "*AUTO*" IN AUTOMATION



If your metal finishing operations are still being carried on with obsolete equipment which loses money for you every day, we can put you ahead of your competition, increase your profit margin.

Increased production lowers the unit cost of your parts processing operations – you spend less for labor, less for power and increase your capacity to handle more business.

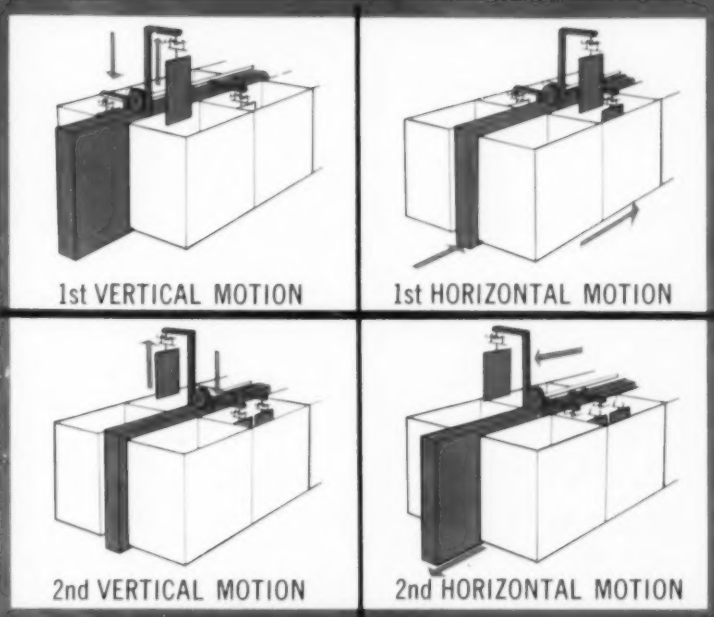
Wagner Brothers Full Automatic* Electroplating systems offer you a new and revolutionary concept in high-volume plating mechanisms – the product of years of engineering research and design refinements – for completely automatic cycling of your metal finishing operations.

*Patents Pending

Basic design details of Wagner Brothers Automatic Plating systems are described and illustrated in Bulletin 50-54, available free upon request.

AUTOMOTIVE MANUFACTURER MODERNIZES WITH WAGNER BROTHERS AUTOMATIC PLATING SYSTEM

This fully automatic plating system was recently installed at a Bay City, Michigan plant for one of the world's largest manufacturers of passenger cars. The unit is 203 feet long, 11 feet wide and operates under 16-foot head-room. Die cast parts are continuously processed through a 40 station copper-nickel-chromium cycle. Production rate is 100 racks per hour, using racks 24″ long, 10″ wide and 64″ deep. Power is furnished by one 25-HP motor. Unit is provided with a push-button central lubrication system, built-in rack stripper, vertical and horizontal agitation. Racks are automatically loaded, unloaded.



HOW IT OPERATES

All transfer and conveying mechanism is mounted on a reciprocating carriage located between the two rows of tanks. Two basic movements bring parts through the full plating cycle, one forward and reverse straight line horizontal motion and one raising and lowering vertical movement.

Plating racks are attached to work-carriers at the loading station. When the machine is started, lifting arms fixed to the carriage engage the work-carriers being transfered and lift them at all points on one side of the machine, carry them forward to the next station where they are lowered and disengaged from the lifting arm. Sequence is simultaneously produced in reverse on the opposite side so that, when lifting arms are lowered on one side, they rise on the other side.

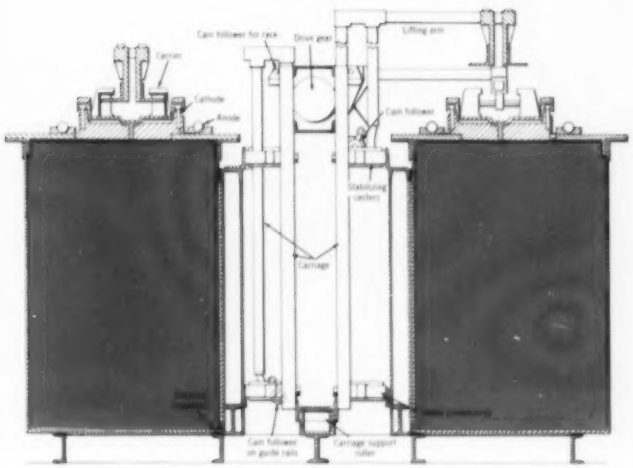
ADVANTAGES and FEATURES

SMOOTH OPERATION — Hydromotor power principle *eases* parts through the plating cycle without jolting starts and stops. Parts never jar from work-carriers into tanks.

LOW POWER NEEDS — Almost perfect balance of work load being lifted at one time requires only *low hydraulic pressures*. One 25-HP motor operates the 203 foot automatic shown.

SIMPLE INSTALLATION — Automatics are delivered to your plant either intact or in 2 or 3 completely assembled sections, depending upon size. *You avoid costly installation.*

MINIMIZED MAINTENANCE — There are fewer moving parts, no vibrating parts, no backlash in automation, low hydraulic pressures, no alignment problems. Overload protection is built into the hydraulic pump. Working parts are easily reached without disassembly.



The entire carriage mechanism is suspended on rollers moving in an oil-filled channel track. This carriage is motivated by a hydro-motor mounted at the base of the machine, fitted with a crank and link to translate the simple harmonic motion of the motor shaft to the in-line reciprocating action of the carriage.

OTHER FEATURES —

OPERATES UNDER LOW HEAD-ROOM REQUIREMENTS • NO OIL-DRIPPING CONNECTIONS OVER TANKS • TRIPLE CONTACT CATHODE BARS FOR SMOOTH CURRENT FLOW • AUTOMATIC HEAT CONTROL FOR ACCURATE RESULTS • CENTRAL LUBRICATION SYSTEM • EASILY VARIED DRAG AND DWELL TIME

In addition to high-volume plating, the Wagner Brothers Automatic is equally-well-suited to anodizing (sulfuric and chromic), phosphate coating, etching, electropolishing, oxide coating, etc.

WAGNER BROTHERS, INC.

403 MIDLAND • DETROIT 3, MICH.

ELECTROLYTICALLY PURE ANODES RECAST FROM *YOUR* NICKEL SCRAP

CONVERT YOUR "WORTH LESS" NICKEL SCRAP INTO PUREST ANODE FORM

A scrap bin full of useless ends, swords and stubs is "worth less" to you. But we can convert this valuable nickel into production-ready anode form, save you dollars you'd lose selling scrap to dealers and purchasing new nickel anodes.

HERE'S HOW WAGNER NICKEL RECASTING CAN BENEFIT YOU

1. **ELECTROLYTICALLY PURE ANODES** – We have a long established reputation for recasting under strictest metallurgical controls – your assurance of 99% pure nickel anodes.
2. **YOUR SCRAP, YOUR ANODES** – You get your own metal back. We do not pool scrap shipments but process each job with individual attention.
3. **MODEST HANDLING CHARGE** – You'll be amazed at how inexpensive it is to turn now "worth less" scrap into good anodes. Our fair prices have made us a leading supplier to the major job plating and manufacturing companies in the metal finishing industry.
4. **READY FOR IMMEDIATE PRODUCTION** – We'll return your nickel scrap in oval cast shapes, to the length you specify, tapped and drilled for hooks.

A WORD OF CAUTION

Unless you are *absolutely sure* of your metal broker, we advise against buying nickel scrap of dubious quality. We reserve the right to refuse junk scrap.

CONSULT YOUR NEAREST WAGNER REPRESENTATIVE OR OUR HEAD OFFICE NOW FOR AN IMMEDIATE QUOTATION

POPULAR WAGNER ANODE FORMS

COPPER	NICKEL	ZINC	TIN	BRASS	TIN-LEAD	TIN-ZINC	CADMIUM	ANODE
●		●		●				FLAT-TOP*
●	●	●	●		●	●		ISOCAST OVAL
			●			●	●	CAST BALL
●			●		●			ISOCAST SLAB
●								LECTROCOP†
●								FORGED BALL

†TRADE-MARK *REGISTERED TRADE-MARK

MAIL

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I'd like more information describing the products checked.

- ☐ Full Automatic Plating Systems
- ☐ Semi-Automatic Platers
- ☐ Electroplating Rectifiers
- ☐ Plating Solution Filters
- ☐ Tanks and Linings
- ☐ Anodes
- ☐ Nickel Brighteners
- ☐ Waste Treatment Systems
- ☐ Nickel Recasting

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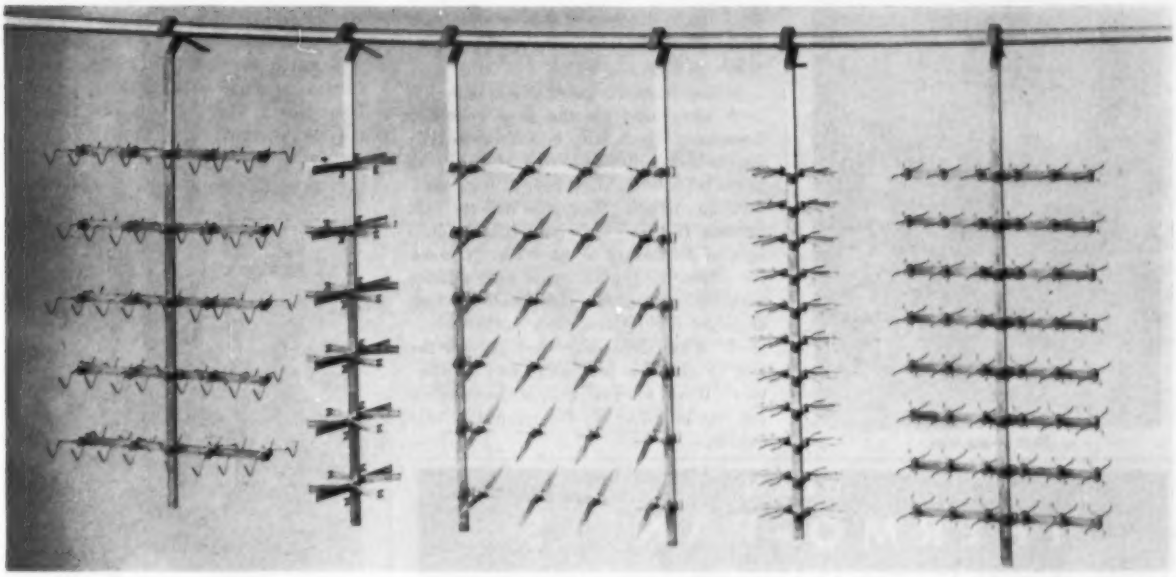


with Standard's ERECT-A-RACK

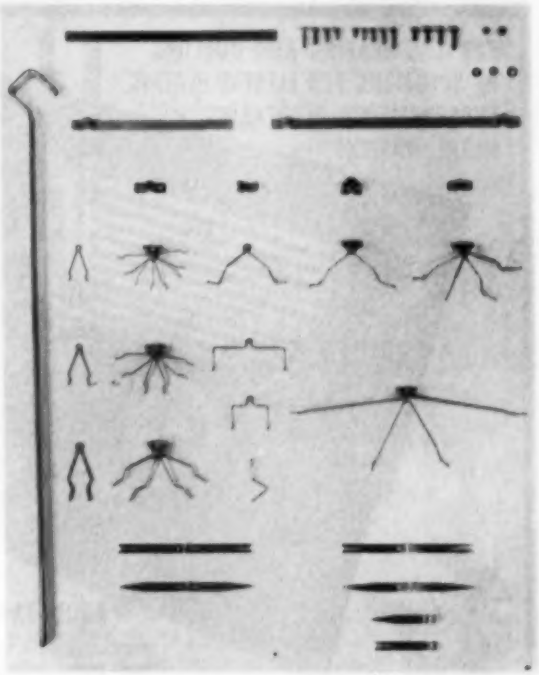
Now you can make up your racks exactly as you need them, when you need them, at the lowest possible cost. You can cut rack preparation time to a fraction for those emergency jobs—using pre-formed parts.

No bulky equipment needed for bending and forming—you need only a screw-driver and wrench. Simple and fast assembly gives you almost any possible combination of rack contacts and arrangements.

You can have the necessary parts for any rack you're likely to need, right in your own stock. A full range of standard parts is available—all you do is clamp the desired contacts on a spine, slide them along to get the desired spacing, and tighten.

No holes to drill—no "not quite right" racks—no big equipment needed—no high cost.

With ERECT-A-RACK you can make up common or really "special" racks—any number of combinations are possible. A few common arrangements are shown above.



See ERECT-A-RACK displayed and demonstrated at Booth 318—Industrial Finishing Exposition—Cleveland

STANDARD
PLATING RACK COMPANY

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ESTABLISHED 1935

Equipment & Supplies

Skin Protection

E—638. Neutralizer—Each year thousands of persons in many types of industries are injured because of acid or alkali burns. Until now, it has been necessary to find just what type of chemical caused the burn to the eyes or skin before proper treatment could be administered by a first aider, nurse or physician.

A new product, called Neutralize, has been introduced by the E. D. Bullard Company, which may be safely used by anyone to counteract both acid and alkali burns. To secure these results, it is necessary only to pour Neutralize into the eyes or over the skin to render the chemical neutral, and therefore, harmless. Neutralize counteracts both acids and alkalies without inducing new complications, such as might occur when other antidotes are used. Water, frequently used to dilute the acid or alkali, is not completely satisfactory. It will wash off some of the chemical but has no effect on the quantities that remain.

Neutralize has a pH of 7. Owing to its buffering action, the hydrogen ion concentration always remains in the physiologic range. Because it is neutral in action, Neutralize can be employed safely in high concentrations to assure rapid and penetrating neutralization, making it equally well suited for the treatment of injuries caused by either acid or alkali splashes. Neutralize is available in 4 and 32-ounce polyethylene bottles.

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THERMO-PANELS
AN IMPROVEMENT ON PIPE COILS
FOR THE HEATING AND COOLING OF SOLUTIONS FOR ELECTRO-PLATING, PHOSPHATIZING, DEGREASING, METAL WASHING
SPECIFY THERMO-PANELS
EASILY REMOVED FROM TANK FOR CLEANING
These engineered, scientifically designed heat exchangers provide performance that can be definitely anticipated. They are low in first cost . . . light weight . . . easily replaced . . . simple to clean. Available in special shapes such as "U's", "L's" and cylinders . . . and a wide range of materials including iron, stainless steel, monel and other special alloys.
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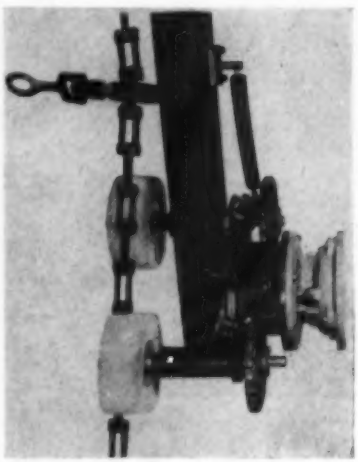

Brushoff

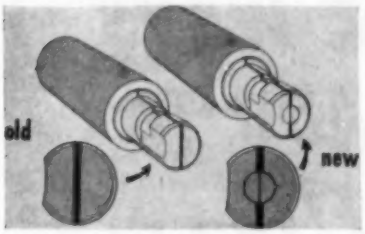
E—639. Conveyor Chain Brusher—Dust and dirt which sticks to lubricating oil on hard-to-reach overhead conveyor chains can now be automatically eliminated without work stoppage by a new conveyor chain brusher designed and built by the Fuller Brush Company Machine Division. The danger of the spoilage of material in processing from the dropping of accumulated dirt is eliminated by two sets of Fullanchor wheel brushes which represent a new improvement in brush design.

The unit is mounted on the monorail supporting the chain conveyor, and the two brushes, powered by one 1 hp motor, pivot on the motor base and bear against the conveyor chain. The brushes can be swung away from the chain if cleaning is desired only periodically.

Material for the wheel brushes is selected to provide the most efficient brushing action to meet the individual problem, as each machine is custom engineered by the extensive research and testing facilities of the Machine Division. Tampico fiber, nylon and crimped steel wire are materials frequently used in these brushes. The fill is driven by a heavy wire staple through a continuous steel channel so that each tuft is held securely, providing strong, long wearing construction.

E—640. Cable Connector—A new, improved model of the Cam-Lok Cable Connector has just been introduced by the manufacturer, Cam-Lok Division of Em-

Equipment & Supplies



The Best Connections

pire Products, Inc., Cincinnati, Ohio. The new construction increases the stability of the solid brass connector, which utilizes a double cam action for a positive, high-pressure electrical cable connection.

The male section of the Cam-Lok connector is split. When inserted in the female section, a strong wiping action is produced. With the new construction, the tips of the split halves are indented, limiting their travel and producing indefinite tension life.

In addition, protection of the male part while disengaged is provided to resist damage from abuse, rough handling or accidents. Even a truck running over the exposed male section, will not collapse it beyond the elastic limits of the material, according to the manufacturer.

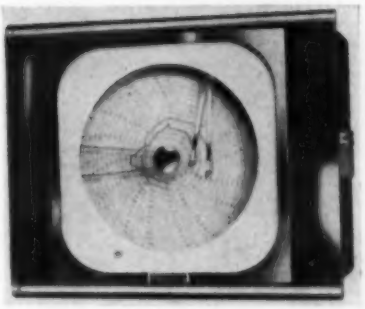
The principle of the Cam-Lok connector is also used on the Cam-Lok quick disconnect electrode holder. Both units will now be manufactured with the new type construction. Tests of the Cam-Lok connector show that the contact made by the unit approaches closely the electrical conductivity of a solid bar of brass of the same size.

E—641. Magic Vapor-Tite Lamp—The Standard Portable Cord Co., Inc. of Mayville, N. Y., has announced the production of a new vapor-tite lamp for illuminating in areas of dampness or vapor where such a condition could cause bulb explosion. The Magic Vapor-Tite Lamp employs the Standard Portable Cord magnetic base, allowing instant positioning of the lamp on any ferrous metal. The unit

Safe and Bright

incorporates a Spero Electric Company, UL approved vapor-proof fixture with 100 watt bulb capacity. The lamp has a guaranteed permanent Alnico V, neoprene covered, 45 lb lift magnet as a base, and is equipped with a 25 foot, UL approved, 16-gauge 3-conductor, type SO, neoprene cord with a 3 prong nonvaportite plug. The cord is impervious to oils, strong sunlight and most acids and chemicals.

E—642. Combination Time-Program and Cycle-Controller—An instrument which combines, in a compact two-case unit, a two-pen, two-cam time-program controller with a cycle controller which times up to eight operations has just been announced by The Bristol Company of Waterbury, Conn. The cases can be mounted side by side or one above the other to suit particular space requirements. The time-program controller can be used to control two variables.



Two In One

E—643. Round Chart Dynamaster Recorder—A new round-chart Electronic Dynamaster Potentiometer recorder that can make two continuous records at the same time on a 12-inch round chart, has just been announced by The Bristol Company of Waterbury, Conn.

In many applications, records of two

PROMAT... FOR RESULTS
IN METAL PROTECTION
Eighteen years of full time, intensive research dedicated to *results* is your assurance that these Promat-quality products can be depended upon to perform as specified . . . render results that *match* your requirements.
Addition Agents for acid cleaners: PROMAT 7073 and 7076.
RESULT: Clean, oxide-free surfaces for electrodeposited metals.
Addition Agents for cyanide and acid zinc plating solutions: C-42, B-4, B-4M, 6550 & 6555.
RESULT: A uniform deposit of fine grained zinc with exceptional luster and protective value.
Addition Agents for cyanide copper plating solutions: PROSALT.
RESULT: A fine grained deposit—excellent for selective hardening and as a base for decorative finishes.
Addition Agents for cadmium plating solutions: C-5028-S.
RESULT: A deposit with high luster and long time protection against corrosion.
Chromate Conversion Coating — The PROSEALS.
RESULT: The ultimate in protection for electrodeposited zinc and cadmium and alloys of aluminum, zinc and copper. Available in olive drab, bronze and bright phases.
White and Yellow Brass — PROBRITE and PROSALT.
RESULT: A full bright highly protective decorative finish which is unaffected by metal allocations.
See our exhibit at the Cleveland Industrial Finishing Exposition and remember . . .
PROMAT MEANS *results* in PROTECTIVE MATERIALS
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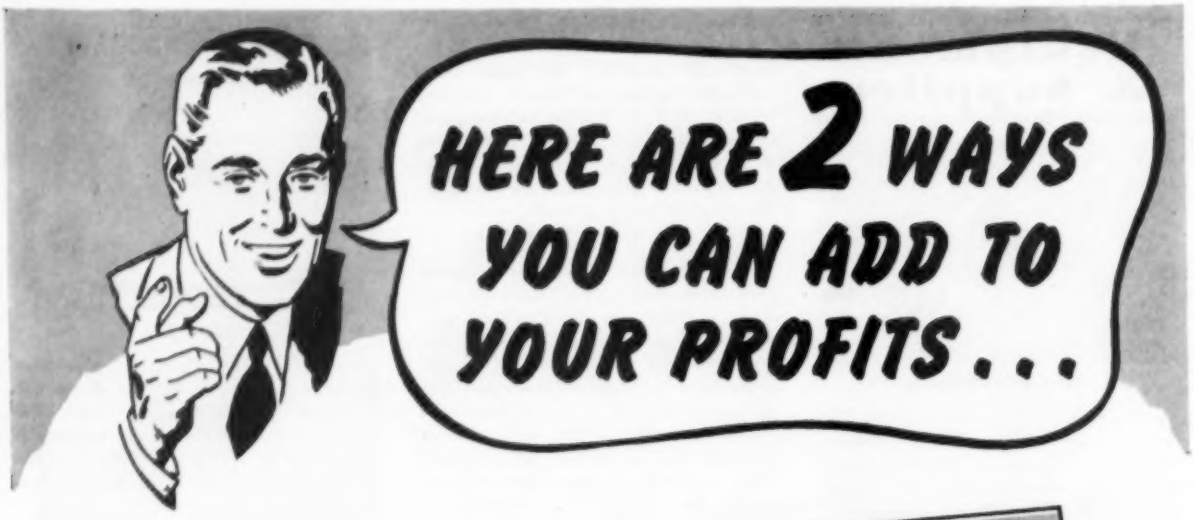

1. ON SILVER PLATING

Use Handy & Harman 999 "Plus" Fine Silver Anodes—the anodes that assure top-quality, trouble-free silver plating because . . . they are held to highest standards of fineness . . . they are free of every trace of impurities that can cause plating troubles . . . they are always uniform. Try them and see the difference.

2. ON REFININGS

Send your silver plating solutions and other precious metal scrap, sweeps and waste to Handy & Harman regularly for refining. Tried-and-proved scientific processes, skilled personnel, super-accurate equipment, long experience—all combine to assure recovery of every bit of value from every lot and an *accurate return every time.* Try us with your next shipment and let the return speak for itself.

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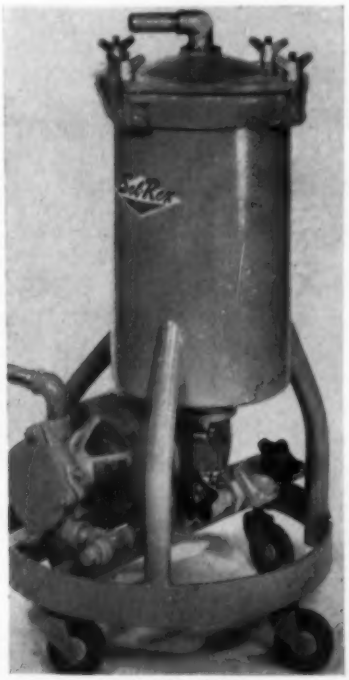
FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 665.

Equipment & Supplies

related measurements must be closely compared with respect to the magnitude and time of any variations from the desired value. With both records on the same chart, such comparison is simpler and more accurate than when two separate charts must be studied.

Specific applications where two simultaneous continuous records are helpful include the taking of wet and dry resistance bulb temperatures for humidity measurements, Btu and temperature differential measurements, and speed of rotation from two different points on a paper machine.

The Dynamaster potentiometer and bridge instruments can be used to measure and control any variable which can be translated into an electrical quantity, such as temperature, *p*H, consistency, speed, pressure, weight, and others.



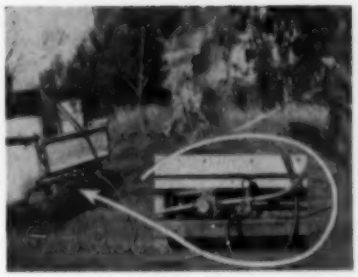
Little Giant Filter

E—500. Sel-Rex "Little Giant" Filter—Continuous high capacity with either a completely new stainless steel-cloth bag element or porous stone is provided by the 800 gph capacity Sel-Rex "Little Giant" filter.

This compact unit is easy to service and can be completely cleaned in less than 15 minutes. The entire filter element is fastened to the hand tightened cover, and can be lifted out manually for quick and thorough washing.

The portable Little Giant requires only 50 inches of head room and measures 32 inches in diameter at the base. All working parts are suspended underneath the tank to protect them from dirt and drippings. Units are constructed of extra low carbon stainless steel, and are furnished complete with operating valves, motor and pump. Units are also available with all iron parts for use with alkaline solutions.

E—645. Watson Rear Power Source and Pump—Among the first truck powered tools to be offered through the H. S. Watson Company's 120 national distributors is a rotary pump. This utility pump develops pressures up to 350 pounds and is designed for handling spray chemicals, liquid fertilizers, petroleum products and water for fire fighting and other valuable uses. Features of the pump include corrosion-resistant construction, permanently lubricated ball-bearings, nylon rollers and a safety shear-pin coupling. Its lightweight, compact design makes it particularly adapted to pick-up and light truck mounting. It is also usable on tractors having a $1\frac{3}{8}$ inch—6 spline pto.



Rear Power Pump

The Watson utility pump is furnished in complete kits ready for installation. The rear power source is also available as a complete kit.

HERE'S THE ANSWER TO YOUR ACID HEATING AND COOLING PROBLEM

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(impervious graphite)

Heating and Cooling Units to Work for You

Shell and Tube • Immersion Coils • Electric Units

√ LONGER SERVICE LIFE . . . NOCORDAL is Practically Immune to Most Strong Acid Solutions

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REDUCE COSTS WITH SOLID PLASTIC TANK GUARDS

of RIGIDON (glass-reinforced) or RIGIVIN (rigid vinyl)

obtain lower initial cost
eliminate coating failures
protect and insulate tanks and coils
minimize part loss caused from direct shorts

Rigidon Guard

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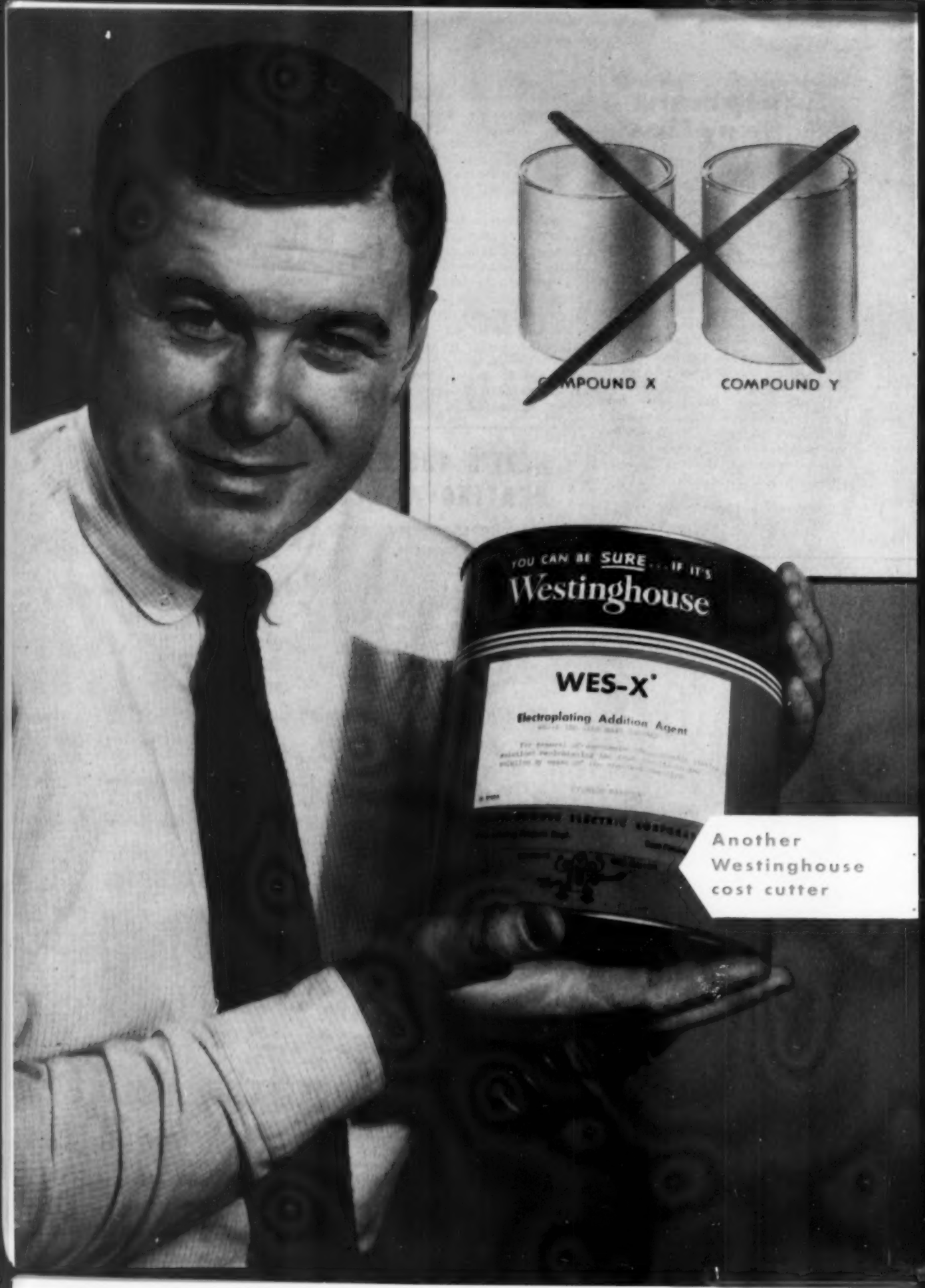
HEIL Products are Sold Through Leading Electroplating Jobbers


COMPOUND X
COMPOUND Y
YOU CAN BE SURE... IF IT'S
Westinghouse
WES-X°
Electroplating Addition Agent
Another
Westinghouse
cost cutter

Now! Control both carbonate and cyanide with one compound . . . WES-X 150

New and exclusive 2-in-1 carbonate remover also replenishes cyanide; is the easy, low-cost way to keep any metal cyanide plating bath at right concentration for high-speed plating.

Westinghouse has developed a new and far better way to control cyanide plating. It is WES-X® 150—an efficient and economical compound which removes carbonates, helps eliminate certain contaminants; and maintains or increases uncomplexed or free cyanide at the same time.

Here are the big advantages of WES-X 150:

- High reaction efficiency—1.1 oz of WES-X 150 removes 1 oz of carbonates.
- Economical—1 oz of WES-X 150 yields 1.0 oz free cyanide.
- Precipitated particle size greater than with other methods—less work to handle and filter precipitate.
- Will not upset hydroxide control.
- Supplied in convenient metal drums.

It is not necessary to batch treat the whole solution when WES-X 150 is used. And once WES-X 150 gets carbonate concentration within required limits for high-speed plating, it is an easy and low-cost means to control this concentration with WES-X 150 . . . the simplest and cheapest way to get the most out of your plating time!

Let a Westinghouse sales engineer help you put this new compound to work in your operation. All it takes is a free survey of your plating process and a specific recommendation on its application. Call your nearest Westinghouse sales office or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-10442

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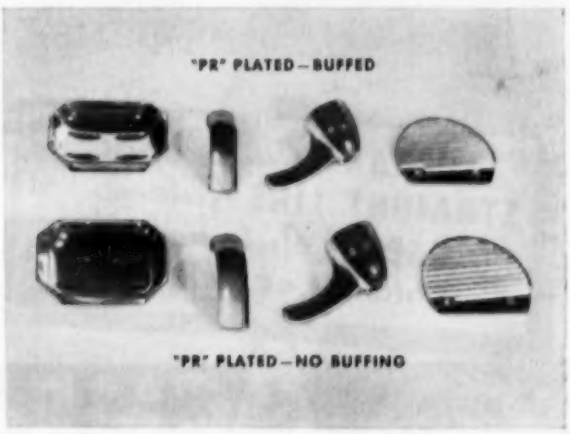
Westinghouse offers metal finishers a unique combination of advanced WES-X Compounds and application service. This Pilot Plant electroplating lab gives new processes a head start—makes them commercially sound. WES-X 150 was proved here. WES-X 100C, 102, 303A and 304 are other compounds.



This is an example of "PR"—Periodic Reverse—Plating. Bottom row shows superior leveling characteristics of "PR" . . . appearance is equal to buffed castings—with *no* prefinishing. "PR" Plating is one of the many *new* ideas and compounds to come from Westinghouse development.

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WIRE BRUSHING
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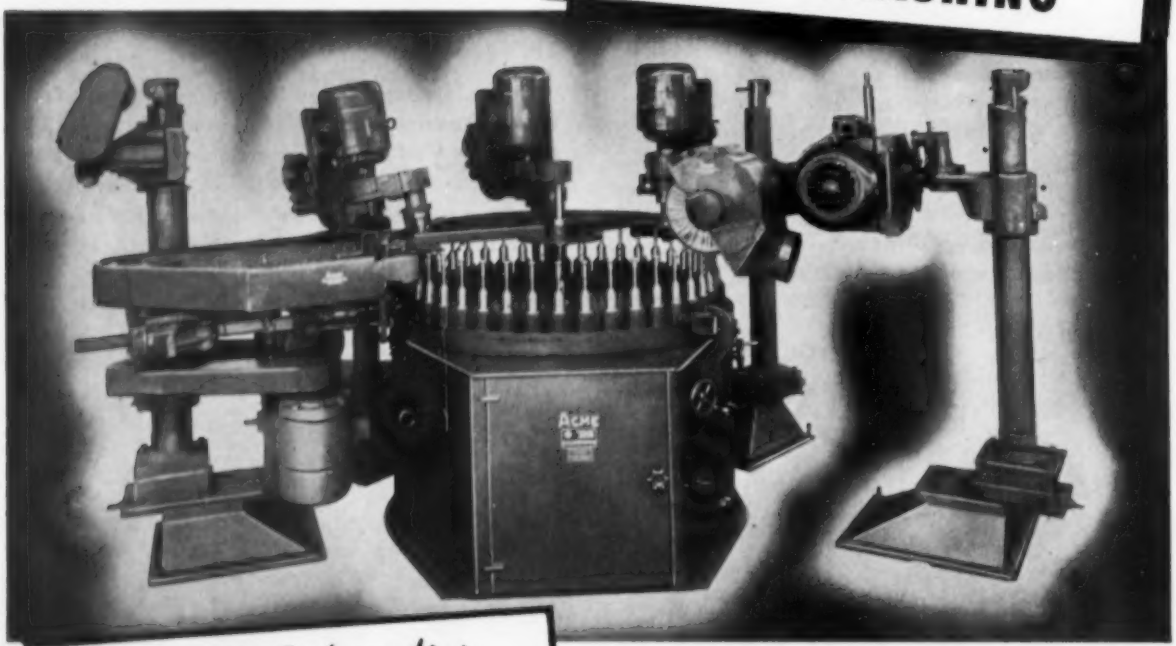

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New Improved AHCOLOID "200"

Non-dusting, low foaming, *improved* Ahcoloid 200 is safer and easier to use than conventional heavy duty cleaners. Special Ahcoloid agents control escape of gases generated during anodic or reverse current cleaning. There is never a spray or overflow of caustic solution.

New, improved Ahcoloid 200 is a free-flowing alkaline powder that quickly and thoroughly frees steel or copper surfaces from grease, oil, metal particles, carbon deposits, or residue from such operations as buffing, stamping, or grinding.

It will pay you to find out more about *new, improved* Ahcoloid 200, the heavy duty cleaner with extra penetrating, wetting, and emulsifying power.

For full details about *new, improved* Ahcoloid 200, write today to Apothecaries Hall Company, 22 Benedict Street, Waterbury, Connecticut.

Apothecaries Hall Co.

Patent Abstracts

DR. D. GARDNER FOULKE

Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co.
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,295, 269, November 23, 1954—Apparatus for Electroplating Wire—A. E. E. De Witz and F. P. Roy, assignors to U. S. Steel Corp.

The apparatus consists of an elongated tank carrying flat shallow boxes of metal as anodes, insulated from the tank but connected to an electrolyte supply pipe through which the anode connection is made. The shallow box anodes carry a multiplicity of nozzle ports.

6 claims.

-AES-

No. 2,695,872, Nov. 23, 1954—Electrolytic Polishing Method—R. Espy, assignor to Armco Steel Corp.

Controlled polishing is claimed using alternating current and a tantalum electrode immersed, along with the stainless steel as the other electrode, in a bath consisting essentially of sulfuric acid and an aliphatic carboxylic acid (glycolic and citric).

3 claims, 2 figures.

-AES-

No. 2,695,876, Nov. 30, 1954—Prevention of Corrosion of Iron by Aqueous Brines—R. Fariss, assignor to the Texas Company, New York.

Ferrous metal is claimed to be protected from the effect of corrosive aqueous solutions by incorporating zinc chromate (5–20 ppm.) in said aqueous solution. Cadmium, alkali metal and alkali earth chromates may also be present.

11 claims.

-AES-

No. 2,696,038, Dec. 7, 1954—Method of Making Chrome Plated Piston Rings—M. Hunt, assignor to Perfect Circle Corporation, Hagerstown, Md.

Mechanical method claimed for providing slotted rings with chromium on outer periphery and slots by making the slots terminate before reaching the inner periphery, plating, then boring the inner portion to open up the slots.

4 claims, 4 figures.

-AES-

No. 2,696,122, Dec. 7, 1954—Variable Stroke Pusher for Plating and Like Machines—C. Clark, assignor to The Udylite Corporation, Detroit, Michigan.

A variable stroke pusher mechanism for moving work along a carrier rail is described.

4 claims.

-AES-

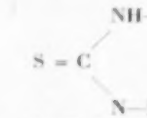
No. 2,696,466, Dec. 7, 1954—Method of Electroplating—J. Beaver, Jr., Osborn, Ohio.

A method for obtaining good coating distribution for objects with recessed portions involves plating in a bath with at least two anodes, one being an auxiliary anode placed in the recessed area, the other outside in normal fashion, i.e. the auxiliary anode between the main anode and the work. First stage of two-step cycle finds both anodes anodic and object cathodic; in second stage main anode of first step is cathodic, the auxiliary anodes anodic and the object bi-polar.

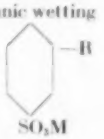
4 claims, 5 figures.

No. 2,696,467, Dec. 7, 1954—Copper Plating Bath and Process—D. Owercash and R. Parks, assignors to General Motors Corporation.

Bright, smooth copper electrodeposits may be obtained from an acid copper solution containing a compound having the nucleus



(0.0003–0.67 oz/gal) and a lignin sulfonic acid derivative (0.001–0.5 oz/gal). Additional claims cover the use of an organic wetting agent with these compounds and more specifically one (0.001–0.6 oz/gal) with the formula where R represents an alkyl group (10–15 carbons) and M is Na, K or H.



Example 1 gives the composition as:

28 oz/gal copper sulfate, pentahydrate	
8 oz/gal sulfuric acid, 66° Bé	
0.005 oz/gal thiourea	(I)
0.02 oz/gal lignin sulfonic acid	

Example 2 includes the further addition of 0.01 oz/gal of an alkyl aryl sulfonate (Oronite mentioned in the disclosure) to (I).

13 claims.

-AES-

No. 2,697,050, Dec. 14, 1954—Recirculation of Waste Pickle Liquor—R. Barnes, assignor to Bethlehem Steel Company.

A process is described for continuously pickling metal passing through a longitudinally disposed bath wherein continuous unidirectional cyclical recirculation of the pickle solution is provided and the chemical composition of the bath is controlled by periodic additions and withdrawals.

13 claims, 7 figures.

-AES-

No. 2,697,051, Dec. 14, 1954—Treatment of Titanium Metal Surfaces—S. Millgren and O. Moles, assignors to National Lead Co., New York.

The removal of adherent scale on titanium is claimed by use of molten alkali metal polysulfide.

7 claims.

-AES-

No. 2,697,130, Dec. 14, 1954—Protection of Metal Against Oxidation—A. Korbelak, assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa.

A method for protecting molybdenum tungsten and their alloys by plating such articles with a film of chromium about 0.00002" in thickness, then electroplating a group VIII metal thereon. See AES Proceedings **40**, p. 93 et. seq.

6 claims, 7 figures.

-AES-

No. 2,697,651, Dec. 21, 1954—Colorimetric Methods of Determining Hypophosphite—G. Gutzeit, assignor to General American Transportation Corp., Chicago, Ill.

A modification of the molybdenum blue method applied to an aqueous acid solution of hypophosphite (e.g. electroless nickel solution). Molybdic acid, a sulfite and a buffer are added to an appropriate sample and held at 50°C for half hour. The hypophosphite is then determined colorimetrically.

7 claims, curve.

-AES-

No. 2,697,670, Dec. 21, 1954—Ceramic Coated Chromium Steel—A. Gaudenzi and H. Giger, assignors to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland.

An article is claimed consisting of 14–30 per cent chromium steel and a ceramic coating the first layer of the enamel being magnesium oxide free and containing 2–12 per cent of chromium oxide and at least one layer of ceramic enamel superimposed upon the first layer containing at least 10 per cent of magnesium oxide.

11 claims.

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APEX "ELECTRO 102" CLEANER

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4TH INDUSTRIAL FINISHING EXPOSITION AND 42ND ANNUAL CONVENTION

June 20-21-22-23

CLEVELAND, 1955

WELCOME!

Left to Right:

E. L. Combs
General Chairman

Leon Westbrook
Exposition Chairman

TO: Members and Guests of the American Electroplaters' Society

"THE Best Location in the Nation" extends a hearty welcome to all of you to come to Cleveland in June. We of the Cleveland Branch of the American Electroplaters' Society have been hard at work since August 1953 to prepare a program that will really interest you. We firmly believe that we have succeeded in doing this.

It is with great pride that we offer you, as an added inducement for the 42nd Annual Convention, the largest Industrial Finishing Exposition ever staged by our Society. Our contacts with the exhibitors indicate that you will see the greatest array of industrial finishing equipment ever assembled into one place. Cleveland's Public Auditorium, which incidentally is one of the most outstanding, will become the world's largest finishing plant for the week of June 20!

Come . . . Learn! We believe that one idea you obtain from the 1001 ideas we offer will pay you dividends in your work.

Eugene L. Combs,
General Committee Chairman

Charles F. Ott
General
Co-Chairman

GREETINGS FROM CLEVELAND BRANCH

Left to Right:
A. J. Lupien
President
Cleveland Branch
AES
and
Treasurer
of Convention Committee

Frances M. Hoffman
Ladies Activity Chairlady

WE OF the Cleveland Branch extend to you, the Members of the American Electroplaters' Society, a sincere welcome to Cleveland, Ohio. Just as warmly too, does our invitation include the Ladies.

Over a period of three years now, we have made plans so that your attendance may be both profitably educational and pleasantly entertaining. To this end, the Educational Program will consist of the 4th Industrial Finishing Exposition and, under the same roof, the technical sessions where timely and carefully selected subjects will be discussed. To the men of note who have thoughtfully prepared the papers, we are deeply indebted.

Every minute for the Ladies will be busy and interesting. The untiring efforts of the Women's Auxiliary of the Cleveland Branch, during the past year, cannot but culminate in a tremendously successful program. Things planned for women by women—What a Prospect . . . !

So again then we say: "Welcome to Cleveland, the Best Location in the Nation." No doubt some day, it will be a joy for you to remember the doings, at the Forty-Second Annual Convention.

A. J. LUPIEN, *President*,
Cleveland Branch

"LIVING in Cleveland" is the theme. We are looking forward to June 19 so that all the Ladies can enjoy Cleveland with us.

First, the Women's Auxiliary to the AES will welcome you on Sunday evening at the Statler Hotel.

Monday morning will be the time when you will be able to officially open the convention with your husband.

At noon the Ladies will gather at "The Alpine Village," for luncheon, Broadway Review, and a T.V. Show. Prizes and gifts will be waiting.

Monday evening, the Metal Finishing Suppliers Association will give their famous and delightful Supper Dance.

Tuesday will bring the traditional "Aunt Ella" Party in Higbee Auditorium.

Wednesday will be a good shopping day. Then off to the Lake Shore Hotel for a "Yummy" luncheon.

Wednesday evening will bring a superb floor show and the lovely dance.

Thursday is another "Fun Day" with the Plato Party at Hotel Cleveland.

Thursday evening is the much anticipated banquet.

The Convention in Cleveland will be the "Best" in 1955. We want you to be with us.

FRANCES M. HOFFMAN,
Ladies Activity Chairlady

AES Officers

Left to Right:
R. A. Schaefer
President, AES

Clyde Kelly
1st Vice-President, AES

Samuel Heiman
2nd Vice-President, AES

Francis T. Eddy
3rd Vice-President, AES

PROGRAM OF EVENTS

All events are at Cleveland Public Auditorium unless otherwise noted. Eastern Daylight Savings Time used throughout program

SUNDAY, JUNE 19

10:00 a.m.—American Electroplaters' Society, Executive Board Meeting—Executive Secretary's Suite, Hotel Statler.

1:00 p.m.—REGISTRATION—Mezzanine Floor. Hotel Statler (This Registration Desk will be open only until 9:00 P.M. Sunday, June 19).

1:30 p.m.—National Association of Metal Finishers, English Room, Hotel Carter

2:00 p.m.—Metal Finishing Suppliers' Association, Inc., Board of Directors' Meeting.

6:00 p.m.—National Association of Metal Finishers, Dinner, Petite Cafe, Hotel Carter

8:30 p.m.—American Electroplaters' Society "Get Together Party," Ball Room, Hotel Statler. Admission by Registration Book Ticket.

MONDAY, JUNE 20

EXHIBIT HOURS 10:00 A.M.–6:00 P.M.

8:00 a.m.—SPEAKERS' BREAKFAST—Parlor "H", Hotel Hollenden.

8:30 a.m.—REGISTRATION—Music Hall Foyer. Public Auditorium, St. Clair Avenue Entrance. (This Registration Desk will be open only until noon, Monday, June 20.)

9:00 a.m.—REGISTRATION—All Day—North Hall, Public Auditorium, Lakeside Avenue entrance.

10:00 a.m.—OPENING SESSION AND BUSINESS MEETING, Music Hall Public Auditorium.

Invocation: Rev. Frank C. Mesle
Member, Rochester Branch

General Chairman:
E. L. Combs
Diamond Alkali Company, Cleveland, Ohio

Business Session:
Ralph A. Schaefer
AES President, presiding

12 Noon Ladies Luncheon and Entertainment, Alpine Village.

12:30 p.m.—SPEAKERS' LUNCHEON, Parlor "H", Hotel Hollenden.

1:30 p.m.—PLANT TRIPS

(a) Ferro Corporation (one bus)
(b) Standard Oil Refinery (one bus)

Make arrangements at Registration Desk, North Hall.

George P. Swift
Past President, AES

Education Committee

Left to Right:

John B. Winters
Chairman

Arthur H. DuRose
Co-Chairman

E. J. Roehl
Co-Chairman

2:00 p.m.—AES Editorial Board Meeting, Executive Secretary's Suite, Hotel Statler.

2:00 p.m.—First Educational Session, Lower Level, Public Auditorium, admission by badge.

Moderator: M. Caldwell, Dohler Jarvis Co., Division of National Lead Co.

"Plating of Beryllium Copper," by S. J. Morana, Beryllium Corporation.

"The Anodic Etch in Preparation for Plating" by V. L. McEnally and Fred G. Brune, Chrysler Jet Engine Plant.

"Abrasive Blasting as a Metal Finishing Tool" by George Barrett, Cleveland Pneumatic Tool Co.; George Kaufman, Cleveland Cap Screw Co., and William C. Ehlert, R. W. Renton & Co.

"Metal Cleaning Evaluations Using Tagged Soils" by J. Hensley, Wyandotte Chemical Corp.

6:30 p.m.—Past Presidents' Dinner—Rendezvous Room, Hotel Hollenden.

7:00-9:30 p.m.—Registration—Rainbow Room, Hotel Carter

9:00 p.m.—Open House—Rainbow Room, Hotel Carter. Admission by Registration Book Ticket. Sponsored by the Metal Finishing Suppliers' Association, Inc. Refreshments and dancing. Buffet served at 10:30 P.M.

TUESDAY, JUNE 21

Exhibit Hours 12 Noon–10:00 P.M.

8:00 a.m.—Speakers' Breakfast—Parlor "H", Hotel Hollenden.

9:00 a.m.—Registration—All Day—North Hall, Public Auditorium, Lakeside Avenue Entrance.

9:00 a.m.—Metal Finishing Suppliers' Association, Inc., Brunch and Meeting, Ball Room, Hotel Hollenden.

9:00 a.m.—Midwest Barrel Finishing Association Meeting, Parlor "F", Hotel Hollenden.

9:30 a.m.—Plant Trip—Euclid Division, General Motors Corp. (two buses) Make arrangements at Registration Desk, North Hall.

9:30 a.m.—Second Educational Session, Ball Room, 4th Floor, Public Auditorium. Admission by badge.

Moderator: B. B. Knapp, International Nickel Co.

"A study of Hydrogen Embrittlement in Regard to Electroplating." Includes a color motion picture, by Carl Biser, Case Institute of Technoiogy.

"Lead-Tin-Antimony Plating" by R. T. Putnam and E. J. Roser, Pratt and Whitney Aircraft Co.

Left to Right:

Robt. W. Renton
Chairman

George A. Shepard
Co-Chairman

Joseph Duffy
Chairman—
Golf Committee

Athletic Committee

"Electroless Nickel Plating of Non-Conductors" by Philip Eisenberg and Harold C. Schneider, Sylvania Electric Products Company.

12:30 p.m.—Metal Finishing Suppliers' Association, Inc.—Annual Golf Tournament, Sleepy Hollow Golf Club.

12:30 p.m.—SPEAKERS' LUNCHEON—Parlor "H", Hotel Hollenden.

12:30 p.m.—BRANCH LIBRARIANS' LUNCHEON—Parlor "B", Hotel Hollenden.

12:30 p.m.—Ladies—Aunt Ella Luncheon and Style Show, Higbee's Department Store Auditorium. Sponsored by Oakite Products, Inc. Host will be Dave Clarin.

1:30 p.m.—PLANT TRIP—Cleveland Graphite Bronze Co. (buses). Make arrangements at Registration Desk, North Hall.

2:00 p.m.—East-West Baseball Game.

2:00 p.m.—THIRD EDUCATIONAL SESSION (DUAL)—Lower Level Public Auditorium. Admission by badge.

Session A:

Moderator: John Martin, Enthone, Inc.

"Some Aspects of Solution Level Control" by J. W. Holland, Loren Stevens, Nello Arterburn. (A committee of the AES Indianapolis Branch.)

"Recovery of Plating Wastes" by Louis Weisberg and E. J. Quinlan.

"Filtering Chrome Plating Solutions" by R. F. Ledford, Industrial Filter and Pump Manufacturing Co. and L. Gilbert, Rock Island Arsenal.

"Report of AES Research Committee" by Earl J. Serfass.

2:00 p.m.—THIRD EDUCATIONAL SESSION (DUAL)—Meeting Room "B", Lower Level, Public Auditorium (admission by badge) (A special session for management purchasing agent, agents and job shop owners.)

Session B:

Moderator: C. R. Wheeler, Elyria Plating Co.

"Job Plating, Shop Costs & Their Relationship to Pricing" by Arthur Pierdon, Art Metal Finishing Co.

"Purchasing Problems of a Manufacturer of Metal Finishing Equipment" by Edwin M. Close, Hanson-Van Winkle-Munning Co.

"How to Buy Plating." Author to be announced.

"Outlook for the Distribution of Nonferrous Metal" by Simon D. Strauss, American Smelting & Refining Corp., So. Plainfield, N. J.

Publicity Committee

Left to Right:
John W. Baker
Chairman

Harry F. Allen
Co-Chairman

WEDNESDAY, JUNE 22

EXHIBIT HOURS 9:30 A.M. 6:00 P.M.

8:00 a.m.—SPEAKERS' BREAKFAST—Parlor "H", Hotel Hollenden.

8:00 a.m.—Michigan State Alumni Breakfast, Hotel Cleveland.

9:00 a.m.—REGISTRATION—All Day—North Hall, Public Auditorium, Lakeside Avenue Entrance.

9:00 a.m.—Ladies—Tour to Westgate Shopping Center.

9:30 a.m.—PLANT TRIPS

(a) Republic Steel Corp. Strip Mill (two buses)

(b) Lewis Flight Propulsion Lab (one bus)

Make arrangements at Registration Desk, North Hall.

9:30 a.m.—FOURTH EDUCATIONAL SESSION (DUAL)—Lower Level, Public Auditorium, Meeting Room "A". Admission by badge.

Session A: Moderator: Lee Morse, Chrysler Corp.

"Electrotinning of Copper Wire from the Stannous Fluoborate Bath" by A. E. Carlson, General Chemical Division, Allied Chemical and Dye Corp.

"Diffused Nickel-Cadmium as a Corrosion Preventive Plate for Jet Engine Parts" by R. W. Moeller and W. A. Snell, Pratt and Whitney Aircraft Co.

"The Application of Ultrasonics to Various Plating Systems" by Stanley R. Rich, Rich-Roth Laboratories.

"The Effect of Different Chromium Deposits on the Fatigue Strength of Hardened Steel" by J. E. Stareck, E. J. Seyb and A. C. Tulumello, United Chromium Corp.

9:30 a.m.—FOURTH EDUCATIONAL SESSION (DUAL)—Lower Level, Public Auditorium, Meeting Room "B". Admission by badge.

Session B: Moderator: F. Bauch, Frigidaire Division, General Motors Corp.

"Progress Made in Airless Spray Painting" by James Bede, Bede International Development Co.

"The Flow Coatings of Organic Finishes" by E. A. Zahn, General Electric Company.

"Qualities, Processing and Future of Porcelain Enamel and Ceramic Coatings" by E. E. Bryant, Ferro Corp.

"Electrophoretic Deposition of Metallic and Composite Coatings" by J. J. Shyne, H. N. Barr, W. D. Fletcher and H. G. Scheible.

12:30 p.m.—BRANCH SECRETARIES LUNCHEON—Parlor "B", Hotel Hollenden.

12:30 p.m.—Ladies Luncheon—Lake Shore Hotel, Sponsored by Udylite Corporation. Host—Dr. R. B. Saltonstall.

WEDNESDAY AFTERNOON HAS BEEN SET ASIDE FOR VISITING THE INDUSTRIAL FINISHING EXPOSITION. NO EDUCATIONAL SESSIONS ARE SCHEDULED.

Plant Visitation Information Center Heads

Left to Right:
William M. King
Chairman—
Plant Visitation

E. A. Solla
Chairman—
Information Center

2:00 p.m.—AES Research Committee Meeting, Executive Secretary's Suite, Hotel Statler.

9:00 p.m.—American Electroplaters' Society—Floor Show and Dance, Ball Room, Hotel Statler. Admission by Registration Book Ticket.

THURSDAY, JUNE 23

EXHIBIT HOURS: 9:30 A.M.–4:00 P.M.

8:00 a.m.—SPEAKERS' BREAKFAST—Parlor "H", Hotel Hollenden.

8:00 a.m.—AES Research Committee Breakfast, Flemish Room, Hotel Hollenden.

9:00 a.m.—REGISTRATION—All Day—North Hall, Public Auditorium, Lakeside Avenue Entrance.

9:30 a.m.—PLANT TRIP—Chase Brass and Copper Co. (two buses). Make arrangements at Registration Desk, North Hall.

9:30 a.m.—FIFTH EDUCATIONAL SESSION—Lower Level, Public Auditorium, Admission by badge.

Moderator: Abner Brenner, U. S. Bureau of Standards.

"Copper Anode Corrosion in Cyanide and Acid Copper Plating Baths" by V. H. Safranek and C. L. Faust, Battelle Memorial Institute.

"Methods of Conducting Classes for Electroplaters" by Ezra A. Blount, Editor, Products Finishing Magazine.

"AES Research Project No. 15—Accelerated Corrosion" by W. L. Pinner.

"AES Research Project No. 12—Oil Spreading Studies" by Dr. Henry B. Linford.

10:00 a.m.—Ladies—Plato Party, Ball Room, Hotel Cleveland.
Joan T. Wiarda will be in charge of prize distribution.

12:30 p.m.—SPEAKERS' LUNCHEON—Parlor "H", Hotel Hollenden.

12:30 p.m.—Ladies—Luncheon, Ball Room, Hotel Cleveland. Dorothy Fuldheim, news analyst, will be feature speaker.

1:30 p.m.—PLANT TRIPS

(a) Nottingham Filtration Plant (one bus)

(b) Sherwin-Williams Paint Company (one bus)

Make arrangements at Registration Desk, North Hall.

2:00 p.m.—Business Meeting, American Electroplaters' Society, Lower Level, Public Auditorium.

7:00 p.m.—American Electroplaters' Society Annual Banquet, Rainbow Room, Hotel Carter.

Admission by reservation ticket. In order to be served, your registration book ticket must be exchanged before 6:00 P.M. on Tuesday, June 21 and Wednesday, June 22, for a special banquet ticket bearing a table reservation at the Main Registration Desk, North Hall, Public Auditorium.

Registration, Finance

Left to Right:
William F. Acks
Chairman—
Registration Committee

John T. Hyduke
Finance Advisor

Not shown:
J. H. Hoefer
Co-Chairman—
Registration Committee

ABSTRACTS OF PAPERS TO BE PRESENTED AT THE AES 42ND ANNUAL CONVENTION

Monday, June 20, 1955

2:00 P.M.—FIRST EDUCATIONAL SESSION

Moderator: M. Caldwell,
Dohler Jarvis Company
Div. National Lead Co.

"The Plating of Beryllium Copper"

By S. J. Morana, Beryllium Corporation

This paper covers the silver plating of finished copper parts, cadmium plating of copper mill products and the chromium plating of plastic mold dies. Also included is a discussion of the general feasibility of plating onto beryllium copper, the ease of plating and the durability of the plating itself.

"The Anodic Etch in Preparation for Plating"

By V. L. McEnally and Fred G. Brune,
Chrysler Jet Engine Plant

The use of a sulfuric acid-epsom salt anodic etch solution in preparation of ferrous parts for plating is discussed. The successful application of this process to obtain good adhesion between base metal and the plated coating is considered. A concept is offered to help in understanding the mechanism by which the anodic etch assists in preparation for plating.

"Abrasive Blasting as a Metal Finishing Tool"

By George Barrett, Cleveland Pneumatic Tool Co.
George Kaufman, Cleveland Cap Screw Co.
William C. Ehlert, R. W. Renton and Co.

This paper covers the preparation of metal prior to paint or plating and its effect on tool and die life.

Tuesday, June 21, 1955

9:30 A.M.—SECOND EDUCATIONAL SESSION

Moderator: B. B. Knapp
International Nickel Co.

"Metal Cleaning Evaluations Using Tagged Soils"

By J. Hensley, Wyandotte Chemical Corp.

Data are presented illustrating the effects of cleaning variables such as al-

Entertainment Committee

Left to Right:

Jos. E. Rhoads
Co-Chairman

J. D. Little
Chairman

kali types, concentration, current density, polarity, and cleaning time, with the various soil types. Use is made of carbon 14 as a tagging agent for the various types of soils.

"A Study of Hydrogen Embrittlement"
By Carl Biser, Case Institute of Technology

Part A—A color motion picture in which caricatures are used to explain the role of hydrogen in embrittling steel.
Part B—A technical paper dealing with a study of the variables which affect the depth of penetration of hydrogen during cathodic pickling.

"Lead-Tin-Antimony Plating"
By R. T. Putnam and E. J. Roser,
Pratt & Whitney Aircraft Company

The proposed paper covers the development of lead-tin-antimony alloy plating as a production process, describing the effect of variations in solution composition and processing conditions such as current density, temperature and agitation.

"Electroless Nickel Plating of Non-Conductors"
By Philip Eisenberg and Harold C. Schneider
Sylvania Electric Products

Electroless nickel was used to plate nonconductors having varied geometry. A description is given of the cleaning and etching cycles, as well as the plating solutions used. Data are presented concerning plate adherence, deposition rates and solution control. Included in the paper are the results of microscopic examination of the plated nonconductors.

2:00 P.M.—THIRD EDUCATIONAL SESSION
Moderator: John Martin,
Enthone, Inc.

"Some Aspects of Solution Level Control"
By J. W. Holland, Loren Stevens, Nello Arterburn,
A committee of the Indianapolis Branch of the AES

Of all the variables encountered in plating, possibly the most neglected is solution level control. It is the object of this paper to emphasize the many relations of solution level control and to review some of the methods employed to accomplish better control.

Banquet Committee

Left to Right:
F. H. Bruening
Chairman
C. Torvay
Co-Chairman

"Recovery of Plating Wastes"

By Louis Weisberg and E. J. Quinlan

This paper describes the layout and operation of a plant for recovery of wastes from cyanide zinc plating and from a chromate conversion coating operation. Arrangements for segregating wastes according to type and for handling miscellaneous wastes from cleaning and dipping operations are covered. Installation and operating costs are also discussed.

"Filtering Chrome Plating Solutions"

By R. F. Ledford, Industrial Filter & Pump Mfg. Co.
L. Gilbert, Rock Island Arsenal

This paper will describe a production installation where filtration in chrome plating is used and the methods in which it is used. It will likewise show the effects of some filterable materials in chromium deposits, the material of construction of the equipment, and the performance of the equipment.

"Report of AES Research Committee"

By Earl J. Serfass

Wednesday, June 22, 1955

9:30 A.M.—FOURTH EDUCATIONAL SESSION (DUAL)

Session A—Moderator: Lee Morse, Chrysler Corp.

"Electrotinning of Copper Wire From the Stannous Fluoborate Bath"

By A. E. Carlson,
General Chemical Division
Allied Chemical & Dye Corp.

A continuous process for the plating of copper wire, which comprises a number of tanks for cleaning and electroplating at high speeds, has been developed. Heavier size wires may be plated and subsequently drawn and annealed to obtain the finer sizes.

"Diffused Nickel-Cadmium as a Corrosion Preventive Plate for Jet Engine Parts"

By R. W. Moeller and W. A. Snell,
Pratt & Whitney Aircraft Company

The proposed paper is a description of the engineering application of 0.0003 inch nickel plate plus 0.0001 inch cadmium diffused at 630° F to provide corrosion protection to intricately shaped low alloy steel parts operating in jet engines at temperatures up to 1000° F. Corrosion data are included as well as production processing experience, in inspection procedures, and precautions of interest to the plater.

Ledford

Stevens

Hensley

Zahn

Barr

Seyb

Snell

Serfass

Weisberg

Moeller

Authors AES Convention Papers 1955

"The Application of Ultrasonics to Various Plating Systems"

By Stanley R. Rich, Rich-Roth Laboratories

A study was carried out in cyanide copper and cyanide cadmium plating baths. This study showed the beneficial effect by greatly reducing anode polarization and increasing the upper limiting current density from 5 to 50 times the normal limiting current density range. This study also was made with various frequencies in the high and low ranges.

"The Effect of Different Chromium Deposits of the Fatigue Strength of Hardened Steel"

By J. E. Stareck, E. J. Seyb, and A. C. Tulumello, United Chromium Corporation

The fatigue properties of hardened SAE 4140 Steel have been investigated when plated with different types of chromium. The effect of chromium plating on fatigue strength of steel is found to be related to stress in a deposit. The crack pattern, characteristic of electrodeposited chromium, is related to stress and thus indirectly to fatigue in unbaked deposits.

Session B—Moderator: F. Bauch, Frigidaire Div., General Motors Corp.

"Progress Made in Airless Spray Painting"

By James Bede, International Development Company

This is a complete description of the theory and practice of airless spray painting. Many of the early difficulties have now been eliminated and this process eliminates much of the waste and other handicaps inherent with conventional spray methods.

"The Flow Coatings of Organic Finishes"

By E. A. Zahn, General Electric Co.

This manuscript is devoted primarily to further the exploration of the so-called low pressure flow-coat method of paint application for industry. This method, in the opinion of the author, incorporates the best opportunities for the greatest gains in economy and the improvement in the quality of the applied finish.

"Qualities, Processing, and Future of Porcelain Enamel and Ceramic Coatings"

By E. E. Bryant, Ferro Corporation

Porcelain Enamel is a glass and as such must always have some of the characteristics of glass. The outstanding qualities and color possibilities of the surface are a necessity for many purposes. Improvement of processing

Authors AES Convention Papers 1955

Fletcher

Rich

Brune

Gilbert

Safranek

Pinner

Stareck

Ehlert

Scheible

Strauss

Arterburn

Caldwell

Knapp

Morse

Bauch

Brenner

Close

Authors AES Convention Papers 1955

methods should greatly increase the use of porcelain enamel for industrial, construction, and domestic applications where it is not now a necessity.

"Electrophoretic Deposition of Metallic and Composite Coatings"

By J. J. Shyne, H. N. Barr, W. D. Fletcher, H. G. Scheible

Electrophoretic deposition is a technique for depositing materials from colloidal dispersions by application of a high d-c voltage to the electrodes. The variables in the deposition process are voltage, electrode separation, dispersion concentration, and time. The process can be used for the formation of nickel, nickel-chromium and other alloy coatings.

Tulumello

Eisenberg

Thursday, June 23, 1955

9:30 A.M.—FIFTH EDUCATIONAL SESSION

Moderator: Abner Brenner, U. S. Bureau of Standards

"Copper Anode Corrosion in Cyanide and Acid Copper Plating Baths"

By V. H. Safranek and C. L. Faust,
Battelle Memorial Institute

Copper anodes containing no oxides furnished less sludge in high speed type copper cyanide solution than other cast-copper anodes contaminated with oxides. As a result, smoother copper plate was possible with the oxygen-free anodes. Electrolysis copper forged and rolled anodes were compared with the cast anodes.

Holland

Faust

"Methods of Conducting Classes for Electroplaters"

By Ezra A. Blount, Editor,
Products Finishing Magazine

This paper will report on electroplating classes currently conducted in private educational institutions and in public school systems, comparing specific courses of study, course outlines, methods and techniques of teaching, development of laboratory experiments, selection of textbooks and other details.

Shyne

Blount

AES Research Project No. 15: "Accelerated Corrosion"

By W. L. Pinner

The paper concerns itself with committee action on approximately 20 types of accelerated corrosion tests, on which work has been performed and of which certain promising ones are receiving continuing attention.

AES Research Project No. 12: "Oil Spreading Studies"

By Dr. Henry B. Linford

Authors AES Convention Papers 1955

Morana

Carlson

McEnally

Bede

Putnam

Roser

Linford

Exhibitors*

159 160 161

ACME MANUFACTURING CO.

EXHIBITING: Automatic polishing and buffing machines.

153

ALLIED CHEMICAL & DYE CORP., GENERAL CHEMICAL DIVISION

EXHIBITING: Material on fluoborate plating solutions.

238

ALLIED RESEARCH PRODUCTS, INC.

EXHIBITING: Features the entire line of "Iridite" chromate conversion coatings for nonferrous metals. These finishes are used for corrosion protection, paint adherence and eye appeal. Sample panels and finished parts will be on display. Plating brighteners and chemicals will also be exhibited.

430

ALMCO DIVISION OF QUEEN STOVE WORKS, INC.

In Almco's Exhibit

EXHIBITING: New barrel-finishing equipment in actual operation. A newly developed fixture machine for special finishing problems will also be on display. Materials handling equipment will be exhibited. Shown also will be Models DBO-1A (shown in photo), DB-50, DB-200 and the DBF-200 Special Fixture Barrel. The DBF-200 is designed for special barrel finishing jobs, and will be of interest to those in attendance at the exposition. R. C. Trow, Vice-President and General Manager, Almco Division, will be in charge.

North Hall

AMERICAN ELECTROPLATERS' SOCIETY

EXHIBITING: The various advantages of membership in the Society will be shown. Publications of the Society will also be on display. Awards will be a feature of the exhibit.

378

AMERICAN BRASS CO.

EXHIBITING: Anaconda "Plus 4" (phosphorized copper anodes) for electrotyping and electroforming.

454

AMERICAN PLATINUM WORKS

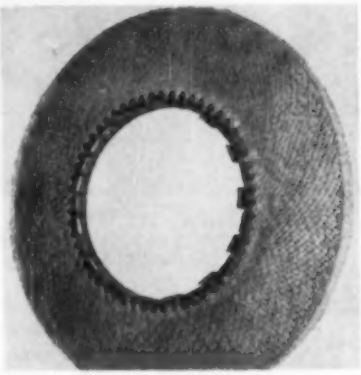
EXHIBITING: Silver plated articles, fine silver anodes (small amount) and silver salts.

**Listings without photos are the result of lateness or unavailability.*

155 156 157

AMERICAN BUFF CO.

EXHIBITING: Latest buffs on a unique moving display. Emphasis will be on the exclusive Unit (Finger) Sisal, Open Bias Sisal, and new 200 line of Bias cloth buffs. Factory representative will be in booth to discuss an entirely new process in buffing and will accept parts to be finished by this new process.



Latest Buffs

348

AMERICAN SMELTING & REFINING CO. FEDERATED METALS DIVISION

EXHIBITING: Anodes for electroplating.

415

ANALYTICAL MEASUREMENTS

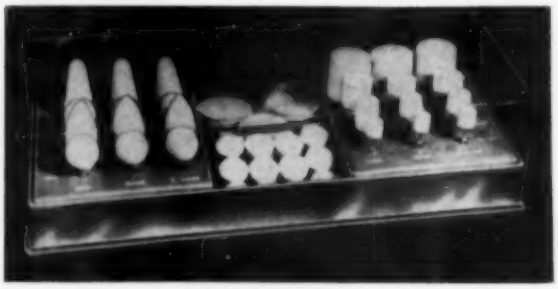
A. M.'s pH Meter

Shown in the photo is a completely self-contained pH meter with batteries, in a bakelite case. This instrument is furnished, camera fashion, in an ever-ready case with novel plastic tubes of buffer KC1 solutions. Both waterproof and fungus-proof, the ever-ready case comes with a combination hand-and-shoulder strap, allowing the instrument to be slung over the shoulder or hung around the neck leaving both hands free.

315

BACON FELT CO.

The photo shows a new assortment of Paramount Brand Felt Bobs packaged in a box that doubles as a handy bench-top holder for the bobs when they are not in use; it is now available from the Bacon Felt Company, Taunton, Mass. The bobs in the K-1 assortment are mounted on 1/8 inch mandrels and



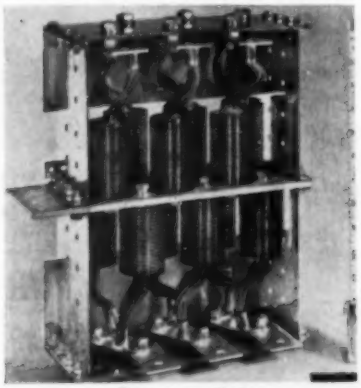
New Assortment

include 12 plain shapes, consisting of four sizes each in soft, medium, hard and rock hard, and 16 standard shapes, also in four sizes each in four degrees of hardness. In addition, the assortment includes 36 wheels in assorted sizes and densities, a 1/8 inch mandrel on which the wheels may be mounted, and six 2 inch x 2 inch squares of rubbing felt for final hand finishing touch-ups.

325 326 327

BART-MESSING CORP.

EXHIBITING: Selenium rectifiers, filters and plating equipment. The items to be featured include: Bright Rhodium Salts—Silver Folder; Bright Silver Sol-U-Salts—Blue Folder; Bright Gold Process—Gold Folder; Jet Plater—Yellow Folder 4 Portable Filters—Green Folder and glossy; Germanium Rectifier—Newsletter and glossy, also "Plating Power." Photo shows typical germanium coil with a rated capacity of 1600 amps at 36 volts which measures only 14 inches high.



Germanium Coil

105

BATTELLE DEVELOPMENT CORP.

(See Globe Chemical Co.)

482

BEACON SUPPLY CO.

EXHIBITING: Complete display of all Beacon standard buffing wheels and buffing compounds. Included will be the latest special shaped bar compounds for automatic buffing use. Another feature will be Tornado, Ventilated, replaceable metal center bias buffing wheel.

355 356

BELKE MANUFACTURING CO.

EXHIBITING: Thinker Boy Racks and the Belke Automatic Transfer Unit will be displayed. Fluted design gives increased anode area per unit of tank space and permits reversing anode. Removable Hook can be used over and over, avoids paying for a hook with each anode. Other Belke Equipment will be shown on colored slides.

369

BINKS MANUFACTURING CO.

EXHIBITING: Binks new line of buffing compound; pumps; display of guns, extractors; pressure tanks; and, compressors.

347

BUCKEYE PRODUCTS CO.

EXHIBITING: Buffing and polishing compositions.

445

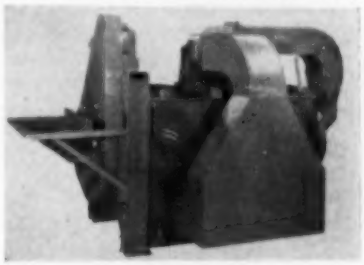
BUCKINGHAM PRODUCTS CO.

EXHIBITING: General display showing polishing and buffing compositions.

410

G. S. BLAKESLEE & CO.

EXHIBITING: A line of degreasing equipment with information on Blakeslee Metal Parts Washing Machines and "Blacosolo" degreasing solvent. Dryers to be shown are for the drying of any cup-shape or screw machine parts that can be tumbled. They are particularly suited in drying zinc or cadmium barrel plated parts. A spiral dryer will be displayed which is steam heated but can be furnished for gas heat or electric heat. A machine of this particular type, together with information on BLAKESLEE solvent vapor degreasing machines and BLACOSOLV degreasing solvent, will also be on display.



Degreasing Machine

465

CHANDEYSSON ELECTRIC CO.

EXHIBITING: Motor generator sets. An ad-matic machine to describe Chandeysson products, facilities, processes, and plant, as well as a sample machine will be on view. Photo shows Chandeysson motor generator.

Chandeysson Motor Generator

313

CHEMICAL CORP.

EXHIBITING: Featured will be—Fume disposal through the use of "Pla-Tank" chemical resistant reinforced plastic materials; new methods for replenishment of Luster-on conversion coatings which eliminate the disposal of spent material; new Luster-on corrosion-resistant finishes for aluminum.

320 321

CIRCO EQUIPMENT CO.

EXHIBITING: Vapor degreasing equipment and solvents; ultrasonic cleaning equipment; and, featuring the latest development in equipment design for vapor degreasing plus ultrasonics.

104

CLEVELAND PROCESS CO.

EXHIBITING: Immersion heaters. The CLEPCO Infra-Red oven will be on display—and one of the CLEPCO Immersion Heaters illustrated will also be shown.

C.P.'s Immersion Heater

Exhibitors

[illegible]

COMMERCIAL FILTERS CORP.

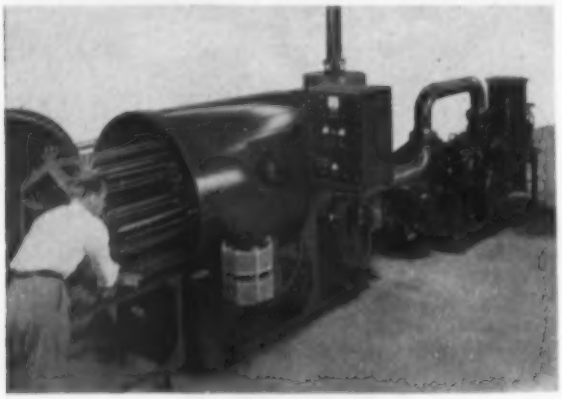
EXHIBITING: "Fulflo" Filters fabricated of steel, steel/rubber-lined and stainless steel and replaceable Honeycomb Filter Tubes of cotton, orlon, dynel, nylon and glassfiber for the filtration of plating solutions, water and compressed air. The photo shows four of a battery of six of 24-tube, rubber-lined FULFLO Filters in the plating plant of a large Boston manufacturer of automotive components such as bumpers. Each of these six filters the entire contents of a 3000-gallon tank of hot acid nickel solution twice every hour to maintain microscopic clarity. This filter will be exhibited.

"Fulflo" Filters

[illegible]

CONSOLIDATED VACUUM CORP.

EXHIBITING: High vacuum metallizing of plastic, metal, and glass materials. A complete line of laboratory and production units for the deposition of metallic layer of a .0005 inch thickness used to enhance the beauty and provide mirror-like finishes on numerous types of products will be on display. Due to space limitations, the coater shown will not be on the floor at the show; however, it will be featured pictorially. In addition a rather complete cross-section of the end-product applications of vacuum metallizing will be displayed. Other important items to be included will be the new single station thermocouple gauge as well as other items used for the creation and measurement of high vacuum.



48-inch Coater by C. V. C.

[illegible]

COWLES CHEMICAL CO.

EXHIBITING: Industrial metal cleaners.

[illegible]

CRO-PLATE CO., INC.

EXHIBITING: Wet blasting equipment.

[illegible]

CROWN RHEOSTAT & SUPPLY CO.

EXHIBITING: Plating and related equipment.

[illegible]

CURTIS MACHINE CORP.

EXHIBITING: Grinding and polishing machines, featuring a new version of a low cost high production "Straigh-O-Matic" type of machine. Model 304C will be in the exhibit and will simulate the operation of larger machine Model 600C.

Curtis at Work

[illegible]

DEAN PRODUCTS, INC.

Dean's Thermo-Panel

EXHIBITING: "Thermo-Panel" heat exchangers for use in the heating or cooling of solutions for plating, degreasing, metal washing, bonderizing, etc. Thermo-Panel Division, Dean Products, Inc., will feature Dean Thermo-Panels on improvement on pipe coils. Thermo-Panels are used for the heating and cooling of solutions, electro-plating, phosphatizing, degreasing and metal washing.

[illegible]

DETREX CORP.

EXHIBITING: Degreasing machines, washing machines, "soni-clean" degreasers and cleaning compounds.

[illegible]

DIAMOND ALKALI CO.

EXHIBITING: Featuring the Diamond Hospitality Lounge. All products of the various divisions of Diamond Alkali Co. are featured in this Lounge.

[illegible]

DIVERSEY CORP.

EXHIBITING: Electrocleaners; soak tank cleaners; and, aluminum process treatments.

[illegible]

DOW CHEMICAL CO.

EXHIBITING: Saran lined pipe, fittings, valves, etc.

[illegible]

DU-LITE CHEMICAL CORP.

EXHIBITING: Black oxide samples and metal cleaners.

Exhibitors

367 368

E. I. DU PONT DE NEMOURS & CO. ELECTROCHEMICALS DEPARTMENT

EXHIBITING: Literature will be available on electroplating and vapor degreasing products made by the Electrochemicals Department. Representatives will be present to discuss these products.

387

ELECTRIC PRODUCTS CO.

EXHIBITING: Electrolytic motor generators.

447

ELECTRO GLO CO.

EXHIBITING: Electropolishing concentrates and finished pieces showing application.

322

ELECTRONIC RECTIFIERS, INC.

EXHIBITING: Rectifier power supplies.

205 206 207

ENTHONE, INC.

EXHIBITING: Samples of various metal finishes and a process demonstration. Enthone's booth will become a center for the solving of the metal finisher's problems at the show. Technical personnel will all be present and facilities will enable quiet discussion of the visitor's problems.

463

FERRO CORP.

EXHIBITING: Portable measuring device, air operated displacement pump.

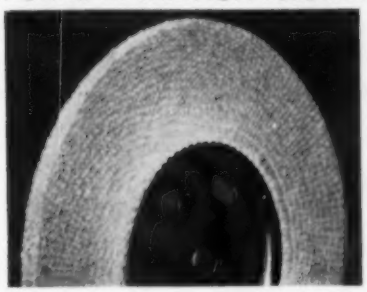
479

FINISHING PUBLICATIONS, INC.

EXHIBITING: Enlargements of magazine front covers and copies of "Metal Finishing" and "Organic Finishing" magazines and guidebooks.

259

FORMAX MANUFACTURING CORP.



Formax Buff

EXHIBITING: Buffing wheels and buffing compounds. Zippo Bias Type Sisal Buffs as illustrated will be on display as well as a complete line of buffing compounds.

201

G. S. EQUIPMENT CO.

EXHIBITING: Electroplating equipment. Photo shows G. S. Barrel which features a radically simplified mechanism, introducing several major developments which increase production and versatility while greatly reducing investment, maintenance and operational costs. An exclusive, patented, dual V-belt suspension-drive eliminates transmission gears and cylinder bearings which are subject to wear and corrosive damage. The

G. S. Barrel

cylinder is suspended in the tank from the superstructure by 2 equal-length V-belts running from drive shaft pulleys to the grooved circumferences at both ends of the cylinder. The belts support the weight of the cylinder while transmitting the power for rotation. Belts are made of acid-, alkali- and stretch-resistant composition, guaranteed 2000-lb. capacity, and heat-resistant to well over 200° F.

363 364

GENERAL ELECTRIC CO. APPARATUS DEPARTMENT

EXHIBITING: Rectifier display for use in electroplating.

476

GENERAL ULTRASONICS CO.

EXHIBITING: Ultrasonic equipment for cleaning, degreasing and plating.

105

GLOBE CHEMICAL CO.

EXHIBITING: Electropolishing and electroplating processes.

402

GLO-QUARTZ ELECTRIC HEATER CO.

EXHIBITING: A complete line of electric immersion heaters for heating all solutions. Among the equipment to be displayed are: Translucent and Transparent fused quartz immersion heaters, steel and stainless steel immersion heaters; copper, lead, and impervious graphite immersion heaters; and, a complete line of small laboratory type electric immersion heaters, of quartz and metal sheath. Also on display will be a complete line of heater controls, with some heaters in operation.

488 490 491

GRAV-I-FLO CORP.

EXHIBITING: Tumbling equipment.

209

HANSON-VAN WINKLE-MUNNING CO.

EXHIBITING: Skip-stop barrel conveyor and miscellaneous items. Good Luck spinning coins will be Nickel-Lume plated on a model full-automatic conveyor and distributed to spectators at Hanson-Van Winkle-Munning's exhibit. At the Nickel-Lume and Level-Lume display, giveaway coins will be automatically plated on an H-VW-M fully automatic elevator-type conveyor. Operation of a production-size electroplating and processing conveyor will be another feature of the exhibit. Spray guns will illustrate spray patterns. A setup of equipment used in

Exhibitors

applying Liquimatic buffing compound will also be demonstrated. Other items in this exhibit will include the Binderized Ruff-L-Buff, Biased Sisalweev sections, a germanium rectifier, a dryer of advanced design and new type plating and burnishing barrels.

[illegible]

HAMMOND MACHINERY BUILDERS, INC.

EXHIBITING: Polishing and buffing machinery. Photo shows a combination of the Hammond Model 7-VRO Lathe with Abrasive Belt Backstands and a Cyclone Duskolector. Equipment of this type will be in operation at the show and also set up for both polishing and buffing. This streamlined, compact, space-saving, modern polishing and buffing unit is becoming increasingly popular due to the fact it is a complete, self-contained unit and can be used for grinding, polishing and buffing and the compactness of installation makes this arrangement very appealing.

Hammond Lathe

[illegible]

HARDWOOD LINE MANUFACTURING CO.

EXHIBITING: Portable "Lazo" lucite plating barrels and other electroplating equipment.

[illegible]

HARSHAW CHEMICAL CO.

EXHIBITING: Electroplating chemicals, processes and anodes.

[illegible]

HAVEG CORP.

EXHIBITING: Corrosion resistant plastic equipment tanks, pipe, valves, hoods, fans, cement, fume duct.

[illegible]

HEATBATH CORP.

EXHIBITING: Black finishes for steel, cast iron, stainless steel, copper, brass, zinc and cadmium; metal cleaning compounds; rust proofing oils; chromate finishes for zinc and cadmium, aluminum bright dip; metal finishing products; heat treating salts; metal strippers; and, organic coatings.

[illegible]

HEIL PROCESS EQUIPMENT CORP.

EXHIBITING: Acid proof plating equipment. The products on display will be those manufactured principally in three main categories: **Control of Corrosive Fumes:** Exhaust Hoods, Ducts, Stacks, and Tank Covers manufactured from steel, steel lined, or solid plastic with either **rigidon** or **rigivin.** Exhaust fans of steel construction with suitable lining and a new exhaust fan of solid plastic construction. Newly engineered corrosion fume washer of solid plastic construction. New "Air Saver" system of plating tank ventilation in operation with the air director and the fume collector hood. **Lined Electroplater Tanks** and **Heating** and **Cooling Units:** New portable tank for acid handling will be displayed with other lined plating tanks. New solid plastic tank and coil guards will be on display with complete line of **"Nocordal"** Heating and Cooling Units. **Miscellaneous Products for Electroplating:** Complete line of Lead Anodes for chrome plating. **Rigivin,** solid plastic pipe and **Carbait** used for exterior acid tank protection. The following individuals will be in attendance at the booth during the convention: E. W. Vereeke, Executive Vice-President; H. P. Heil, Vice-President; R. I. Peters, Manager Standard Production Division; R. M. Cutter, Manager Lining and Coating Division; E. G. Huth, Manager Metal Fabricating Division; B. C. Mulheran, Manager Heilex Products Division; K. C. Norton, Rigidon Plastic Division; D. E. Holmgren, Rigidon Plastic Division; F. W. Arndt, Chief Engineer; R. F. Protiva, Sales Engineer; R. E. Scheel, Sales Engineer (Chicago); P. L. Veit, Sales Engineer (New York).

[illegible]

R. O. HULL & CO.

EXHIBITING: Plated parts, plating control apparatus, demonstration and literature.

[illegible]

IMPERIAL RACK CO., INC.

EXHIBITING: "Naraco" products will present the various steps in the manufacture of a common plating rack. Products to be exhibited: plating racks and fixtures; anodizing racks; "Naraco" removable and replaceable work holders, masking molds; rubber masks; and, "Plastisol" coatings.

[illegible]

INDUSTRIAL ELECTROPLATING CO., INC.

EXHIBITING: Ventilation equipment and fume separators. One item will be an operating model of a recovery system (ion exchange) treating a chromic acid solution. Also a destruction system for a chromic acid solution. A cut-away rubber-lined centrifugal pump operating at one rpm which will show the features of construction. In addition a display of literature describing products.

[illegible]

INDUSTRIAL FILTER & PUMP MFG. CO.

EXHIBITING: Two new types of filters; a working model waste treatment plant; a new lined centrifugal pump; and, a new molded heat exchanger floating head.

[illegible]

INDUSTRIAL FINISHING MAGAZINE

EXHIBITING: Samples of "Industrial Finishing" and other data on the industrial finishing industry.

[illegible]

INDUSTRIAL INSTRUMENTS

EXHIBITING: An automatic rinse tank controller.

[illegible]

INTERNATIONAL NICKEL CO.

EXHIBITING: Several new and novel uses of nickel plating demonstrating versatile characteristics of the deposits.

[illegible]

INTERNATIONAL RUSTPROOF CORP.

EXHIBITING: Rust preventives and corrosive solvents.

[illegible]

KOCOUR CO.

EXHIBITING: Thickness testing and buffing demonstration. Analytical sets, pH instruments, rectifiers, and buffing compositions.

Exhibitors

358

KRAFT CHEMICAL CO.

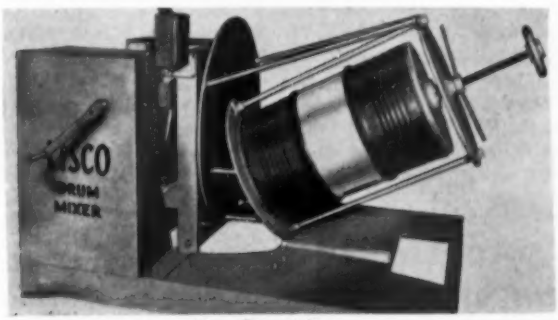
Kraft CYA-NODES

EXHIBITING: Chemicals. Photograph illustrates CYA-NODES, which will be featured. The CYA-NODES are of one-half ounce Potassium Cyanide pellets which are cylindrical and about the size of a marshmallow. CYA-NODES are dust-free, sulfur-free, and nonflaking. They are easy to weigh and can be handled safely in lightweight metal baskets used for dissolving.

511

LANSING INDUSTRIAL SALES CO.

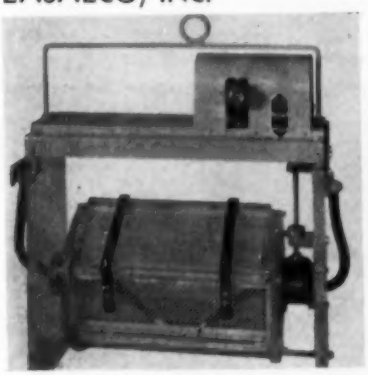
EXHIBITING: A one-quarter size model, made of aluminum of the "Lisco" Drum Mixer. This model will be operated by hand instead of motor. Also on display will be samples of casters and rubber wheels.



Lisco Drum Mixer

342

LASALCO, INC.



Lasalco Utility Barrel

EXHIBITING: Equipment, chemicals and supplies for electroplating, anodizing and polishing. Among the equipment displayed in the Lasalco booth at the Industrial Finishing Exposition will be Lasalco's new Utility Barrel Plater equipped with high temperature Plexiglas cylinder as pictured.

472

LEA MANUFACTURING CO.

EXHIBITING: Abrasive compositions and electrochemical processes. This year's Lea exhibit will be a combination type exhibit for the parent company and affiliates, Lea-Michigan, Inc., Lea Manufacturing Company of Canada, and Lea-Ronal, Inc., of Long Island City. The only piece of equipment, which will be exhibited this year, will be the cLEAn-Flo Filter. The principal theme of the exhibit will be the dissemination of information on the latest production proven methods, processes and techniques for abrasive and electrochemical surface finishing. Lea booths will be manned by a staff of electrochemical and metal finishing engineers, who will gladly answer any and all questions regarding such finishing operations as satin finishing, polishing, burring, buffing, lapping, liquid spray buffing, and bright high speed electroplating.

473

LEA-MICHIGAN, INC.

(See Lea Manufacturing Co.)

472

LEA-RONAL, INC.

EXHIBITING: Plating equipment and plated parts.

405

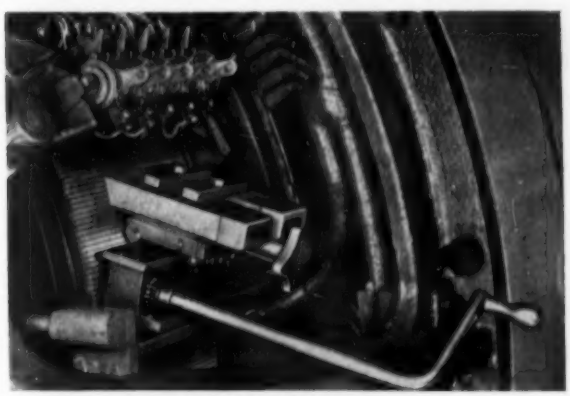
LORD CHEMICAL CORP.

EXHIBITING: Tumbling barrels, compounds media, "before and after" samples.

447

MARTINDALE ELECTRIC CO.

EXHIBITING: Protective dust masks for protection of workers against non-toxic dusts and non-toxic paint sprays. Equipment for maintaining and repairing electroplating generators and for general electric maintenance. Included will be commutator undercutters and saws, commutator grinders and "Commstones", armature repair tools, electrical testing instruments, etc. The picture shows a Martindale Chair-Drive Commutator Grinding Tool, mounted, and in operation.



Commutator Grinding Tool

365 366

McALEER MANUFACTURING CORP.

EXHIBITING: Polishing and buffing compounds, buffs and polishing wheels. Also electroplated products such as stainless steel wheel discs, die castings, etc., will be on display.

422 423 424

McGEAN CHEMICAL CO.

EXHIBITING: Anodes and plating chemicals.

393

MAN-GILL CHEMICAL CO.

EXHIBITING: Industrial metal cleaners and chemicals.

Exhibitors

342

METAL AND THERMIT CORP.

EXHIBITING: Chemicals and anodes for electroplating of tin and tin alloys.

334 335

MICHIGAN BUFF CO., INC.

EXHIBITING: Buffs, polishing wheels, and polishing supplies.

349

MICHIGAN CHROME AND CHEMICAL CO.

Racks and Coatings

EXHIBITING: Rack coatings, stop-off materials, "Plastisols" used in the electroplatng industry, and the metal finishing field in general, **MICRO** line—rack coatings and stop-off materials will be shown.

452

MIDWEST BARREL FINISHING ASSOCIATION

453

MINNESOTA MINING & MANUFACTURING CO. HONITE DIVISION

By Honite

(See Midwest Barrel Finishing Association.) Mid-West Barrel Finishing Association will be displaying "HONITE" Brand Barrel Finishing Products (abrasive chips, compounds and equipment). Two of the main items on display will be "HONITE" Brand DV 3 Deluxe Model Barrel and a recently introduced Standard Model Barrel, designated VS 3.

344 345

MITCHELL-BRADFORD CHEMICAL CO.

New Headquarters

EXHIBITING: Various fabricated parts finished in Mitchell-Bradford's "Black Magic" Processes. Products will be: "Black Magic" Type A for steel; "Black Magic" S.S.; "Black Magic" zinc black; "Black Magic" for cadmium; "Black Magic" chromate O.D.; "Black Magic" chromate bright; Rustproofing oils and waxes; "Magiclene" No. 2; "Pik-Aide"; "Quick-Pik"; Magic Dry; Composition D; Magic Mist; Metal Cleaners; and, heat treating salts.

382

MUNNING & MUNNING, INC.

EXHIBITING: Munning-Green Bench rectifier; Munning-Green "Selectoplater"; Munning double barrel tumbler; and, Munning-Elgin type tumbler.

391

NATIONAL CARBON CO., A DIVISION OF UNION CARBIDE AND CARBON CORP.

EXHIBITING: "Karbate" Plate type and tube and bundle type heat exchangers. "National" carbon brick for tank lining.

336

NOBLES ENGINEERING & MFG. CO.

EXHIBITING: Centrifugal dryer and accessories.

426

OAKITE PRODUCTS, INC.

EXHIBITING: Cleaning equipment and exhibits of products treated with Oakite materials including "Rustripper", new alkaline material that removes rust, grease, paint in hot or cold solution, with or without current, with or without cyanide; Oakite Pickle Control No. 5, the stable liquid material with its own built-in foam blanket; the Oakite "Cryscoat" process of zinc- and iron-phosphating; compounds for pre-paint conditioning of metals; alkaline and solvent paint stripping materials; and compounds for paint spray booth water treatment. F. H. Bruening, manager of Oakite's Cleveland division, will be in charge of the exhibit. Oakite technical representatives A. H. Horst, J. C. Tervay, W. R. Peate, M. R. Stevens, W. B. McClain, M. L. Hahn, W. L. Russell, R. J. Crane, and R. B. Potter will also be in attendance, so will D. X. Clarin, manager of the New York and metropolitan division. G. A. Lux, director of technical information, and M. F. Maher, manager of Oakite's metal industries division, will be on hand to attend the meetings of the AES, and D. X. Clarin will again be host at the annual "Aunt Ella" luncheon.

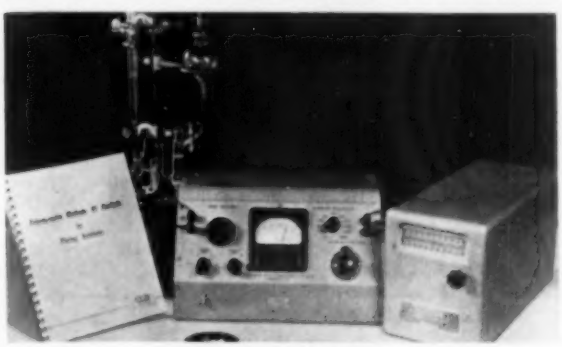
376

PATENT BUTTON CO.

EXHIBITING: Polarographic equipment, flame photometer.

376

PATWIN INSTRUMENTS



Patwin Model C-1

(See Patent Button Co.) The Patwin Model C-1 Electro-Polarizer, an instrument designed specifically for the routine analysis of plating solutions, and the Patwin Model R-1 Electro-Polarizer, an instrument designed for both routine control and research work in larger plating establishments will be on

display. In attendance at the Exposition will be George Tatoian, Research Engineer; Frank Tirendi, Finishing Foreman; and A. D. Cronk.

352

PENNSYLVANIA SALT MFG. CO.

EXHIBITING: Cleaning for electroplating featuring: "Pennsalt" 36, K-S, and PM-90. Aluminum etching featuring: "Pennsalt" AE-16 and "Aldox", and miniature automatic etching cycle.

347

PLATERS RESEARCH CORP.

EXHIBITING: "Nickelite"—nickel barrel brightener. "Pocket Handi-Gage"—Magazine thickness tester.

North Hall

PLATING MAGAZINE

EXHIBITING: Market data on the industrial finishing industry; samples of PLATING, the official organ of the American Electroplaters' Society; data on PLATING Magazine and other publications of the American Electroplaters' Society.

500

POOR AND CO., PROMAT DIVISION

EXHIBITING: The new process "Prosealing", the last word in positive protection for cadmium, zinc and aluminum.

428

PRODUCTION MACHINE CO.

EXHIBITING: A display and demonstration of centerless polishing and buffing machines for tubing and bar stock. Machines using buffing wheels and felt belts with compositions applied.

361

PRODUCTS FINISHING MAGAZINE

EXHIBITING: Data on and samples of "Products Finishing" magazine.

323

RAPID ELECTRIC CO.

EXHIBITING: Selenium Rectifiers. Featured will be the new Rapid Germanium Rectifier. The model displayed will show the new compact size and high quality design and workmanship of the Germanium units. A working chrome plating installation will be operated by the Chrome Electro-forming Corp. of Detroit, Mich. Also on display will be working Rapid Selenium Rectifiers, both floor and bench models including the new Rapid "Sensing" Rectifier which automatically increases output voltage as tank amperages increase, thus helping to stabilize current density on material being plated in automatic plating operations. The ease of using motorized INDUCTROL controls will be demonstrated. An automatic programming unit will be shown as well as a complete display of the components of Rapid Rectifiers. Complete literature and technical data on all Rapid products will be distributed. Booth personnel includes: James A. Viola, President; Wm. E. Bryan, Sales Manager; Robert Tedesky, Sales Department; Frank La Mantia, Production Manager; George De Mirjian, Chrome Electro-forming Corp.

433

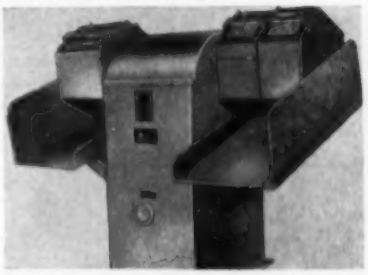
RAMCO EQUIPMENT CORP.

EXHIBITING: Vapor degreaser equipment. The following people will be in attendance at the Booth: Max Randall, Martin Randall, William Carnegie, Jesse Baker, Jim Carlton, Bob Pinchott.

301

RAMPE MANUFACTURING CO.

EXHIBITING: Tumbling equipment. Machine illustrated which will be displayed at the show—Twin-Precision Barrel Finishing Machine with multiple barrels.



Rampe's P.B.F. Machine

350

R. W. RENTON & CO.

EXHIBITING: Jet blast liquid honing equipment, plating racks, buffing compositions, lined process tanks.

North Hall

RESEARCH COMMITTEE

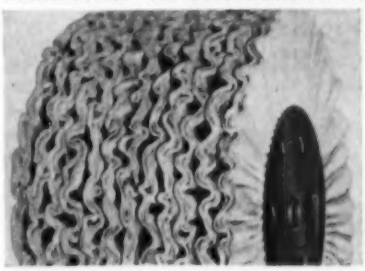
AMERICAN ELECTROPLATERS' SOCIETY—

EXHIBITING: Display will feature American Electroplaters' Society Research Projects 12, 14, 15 and 5. Project 15 (accelerated corrosion tests for the performance of plated coatings) will be one of the highlights of the entire show.

310

SCHAFFNER BUFF CO.

SCHAFFNER MANUFACTURING CO.—



EXHIBITING: Buffing compositions, buffs, anodes, grease stick, grip grain, patented "No-Nubbin" buffing compound.

Schaffner Buff

327

SEL-REX PRECIOUS METALS INC.

346

J. J. SIEFEN CO.

EXHIBITING: Liquid buffing compounds and spray equipment.

453

SMOOTHEX, INC.

EXHIBITING: Copper plated parts and various Smoothex products. Parts similar to those shown in photo will be on display in booth.

By Smoothex

375

SOLVENTOL CHEMICAL PRODUCTS, INC.

EXHIBITING: Industrial and metal cleaning compounds.

Exhibitors

329

SOUTH FLORIDA TEST SERVICE

EXHIBITING: A photographic display of a test service and facilities for the finishing industry. Included are pictures of various exposure locations and samples on test to determine the effects of actual weathering, corrosion and sunlight on all types of materials and products. Exhibit includes large hand-colored photographs as well as continuous slides. The exhibit is entirely new this year. Warren W. Smith and Earl DeNoon will be in attendance. Full information on the scope of service and facilities available will be given on request.

South Florida's Home

506

SPARKLER MANUFACTURING CO.

EXHIBITING: Rubber lined Sparkler horizontal plate plating solution filter, an hydraulic oil filter, and literature describing all units manufactured by Sparkler. The unit illustrated—Model 7-33 Sparkler Filter is used in the filtration of both acid copper and nickel plating solutions and, when furnished with the proper cartridge, this unit can be used on both cyanide and acid solutions.

337

SPEE-FLO MANUFACTURING CORP.

EXHIBITING: Hot spray heaters. The Spee-Flo Company will feature their new line of all-electric hot spray heaters. The hot spray process is not new, but the renewal of trade interest in hot spray parallels the development of the simple, trouble-free Spee-Flo heaters. All Spee-Flo models will be shown and the principle of hot spray demonstrated with an operating display.

Spee-Flo Display

350

STANDARD ELECTRICAL TOOL CO.

EXHIBITING: Buffing and polishing lathes and special finishing equipment.

316

STANDARD PLATING RACK CO.

EXHIBITING: Plating racks and masking devices for the selective plating of parts.

112 116 130

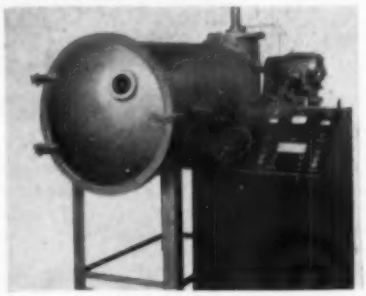
FREDERIC B. STEVENS, INC.

EXHIBITING: A complete line of automatic plating and processing equipment. Be sure to see "Little Steve"—another new Frederic B. Stevens, Inc., development. "Little Steve" is a small automatic with a big capacity for its size. It will give you automatic production and automatic control—fewer rejects, dependability and lessens occupational disease hazards. In addition to the new "Little Steve" in actual operation, a Stevens Model MVS Variable Speed Buffing and Polishing Lathe, and photographs and descriptions of the new Stevens "Stevadoer" will be featured. The Stevens motion picture, "Industrial Album," featuring the automatic barrel plating and processing operation at the Shakeproof Division plant, Illinois Tool Works, will be shown in the booth.

516

F. J. STOKES MACHINERY CO.

EXHIBITING: Vacuum metallizing equipment. Photo shows 24-inch diameter laboratory and pilot plant vacuum metallizer which will be in operation at the Show. A 36-inch diameter vacuum metallizer which will also be on display at the Show.

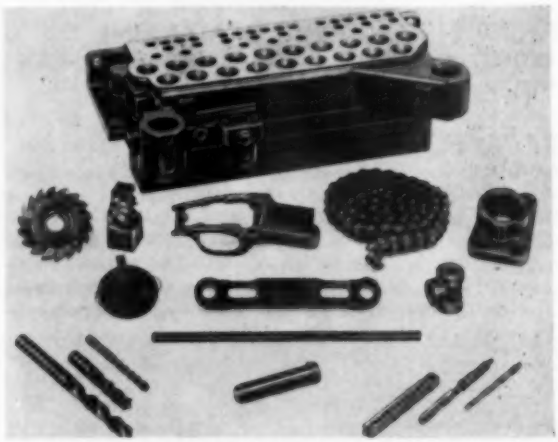


Stokes Metallizer

432

SWIFT INDUSTRIAL CHEMICAL CO.

EXHIBITING: Black oxidized parts, samples of work treated in Swift cleaning, heat treating and blackening baths—plate work, etc. Among the features of the Swift Industrial Chemical Company booth at the Metals Show will be a display of Swift Blackening Compounds and Promat Acid Additives. Photo shows some items furnished with Swift compounds.



Swift Exhibits

457

TECHNIC, INC.

EXHIBITING: Gold and rhodium plated material.

129

THER ELECTRIC AND MACHINE WORKS

EXHIBITING: Plating rectifier.

302

H. O. TRERICE CO.

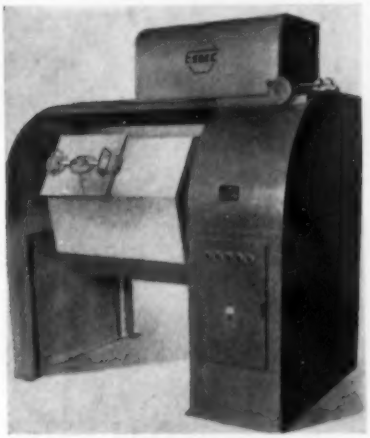
EXHIBITING: Temperature and pressure instruments.

Exhibitors

389

TUMBLING SALES AND SERVICE CO.

EXHIBITING: Barrel finishing equipment and supplies. Two new pieces of equipment will be introduced: one is the ESBEC Series HD Heavy Duty Tumbling barrel and the other is the new ESBEC Roller Separator which operates on a totally new principle and will make separations which cannot be accomplished either magnetically or by screening. Photograph illustrates ESBEC Series HD Heavy Duty Tumbling Barrel, Model 3232-2-V, with a two compartment drum having a capacity of 15 cu ft. The machine is shown with the front safety guard raised for loading and unloading.



Tumbling's Barrel

107

TURCO PRODUCTS, INC.

101 120 151

UDYLITE CORP.

EXHIBITING: Automatic plating equipment, rectifiers and other electrcal equipment. Also on exhibit will be Udylite plating processes and supplies used in those processes.

391

UNION CARBIDE & CARBON CORP.

NATIONAL CARBON COMPANY, DIVISION—
(See National Carbon Company.)

347

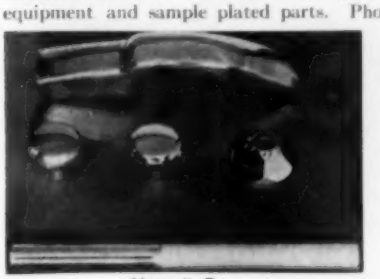
UNIT ASSEMBLIES, INC.

EXHIBITING: New non-destructive electronics thickness gage for measuring plated thickness on magnetic and non-magnetic base materials. Also featured will be a new automatic rheostat and periodic-reverse plating units.

338 339 340

UNITED CHROMIUM, INC.

EXHIBITING: Metal finishing materials, including plating equipment and sample plated parts. Photograph shows parts which have been plated with United Chromium's new "Crack-Free" Chromium. United Chromium, Inc., will display Unichrome SRHS Chromium plated parts, as well as their line of Ucilon Protective Coatings, Unichrome Stop-offs, and Unichrome Dips. The line of plating equipment now being offered by United Chromium, Incorporated will also be featured.



United's Parts

111

U. S. STONEWARE CO.

EXHIBITING: Paints, coatings, linings and anodes.

471

UNIVERTICAL FOUNDRY & MACHINE CO.

EXHIBITING: Anodes and plating materials.

492 502 503 504

WAGNER BROTHERS, INC.

EXHIBITING: Plating and polishing equipment and supplies including the following: (1) Introduction of the new "Wagner Brothers" "X" automatic plating machine, featuring outstanding simplicity, economy and flexibility; (2) Display of the "Wagner Brothers" automatic loader and unloader for use in connection with automatic plating equipment; (3) "Wagner Brothers" filtration equipment; (4) "Wagner Brothers" rectifier equipment.

329

WALLACE & TIERNAN, INC.

EXHIBITING: Chlorination control equipment for treatment of industrial wastes.

405

WHITE-ROTH MACHINE CO.

EXHIBITING: Tumbling barrels and materials.

400

EDWIN L. WIEGAND CO.

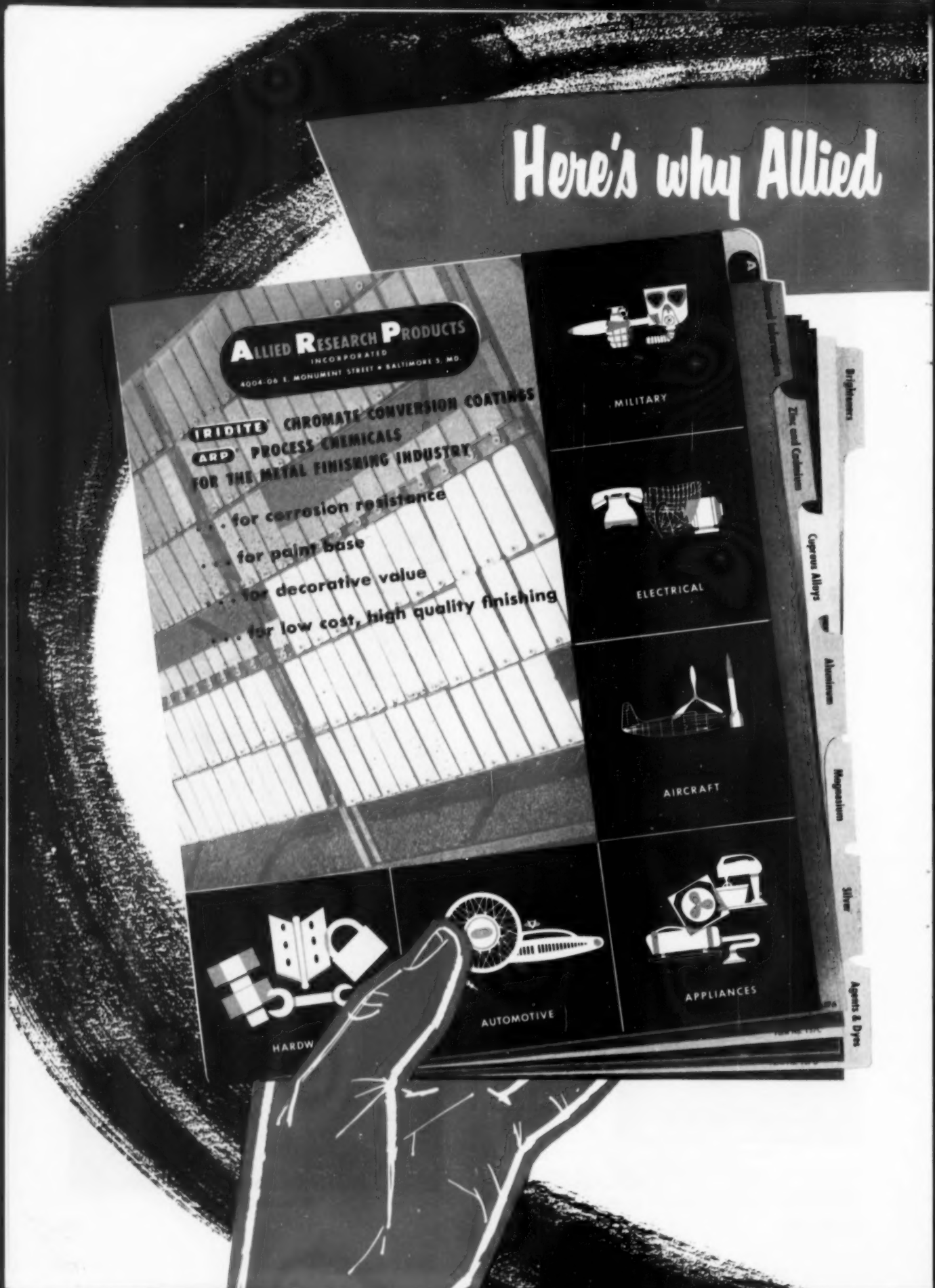
EXHIBITING: Over the side heaters for plating tanks, screw plug immersion heaters, radiant heaters and panels, and circulation heaters.

236

WYANDOTTE CHEMICALS CORP.

EXHIBITING: Metal cleaners and related products. Wyandotte Chemicals will feature the newest products for cleaning and related operations offered to the metal finishing industries. A special feature will be an exhibit showing the use of radioactive soils in metal cleaning research. A Geiger counter will demonstrate the greater efficiency of properly compounded metal cleaners as contrasted to single detergent materials: see photo. Wyandotte Chemicals Industrial Laboratories were pioneers in the application of radioactive soils to the study of cleaning efficiency. Another feature will be a display of parts and panels illustrating problems in cleaning before plating, barrel finishing, paint stripping and other operations. The booth will be staffed by P. N. Burkard, Manager Industrial, Railroad and Aircraft Department; R. J. Racine, Manager Industrial Sales; Edward Kubis, Technical Service Department; and Wyandotte Chemicals' Industrial Department Representatives.

Wyandotte's Display


Here's why Allied
ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.
IRIDITE CHROMATE CONVERSION COATINGS
ARP PROCESS CHEMICALS
FOR THE METAL FINISHING INDUSTRY
. . . for corrosion resistance
. . . for paint base
. . . for decorative value
. . . for low cost, high quality finishing
MILITARY
ELECTRICAL
AIRCRAFT
APPLIANCES
AUTOMOTIVE
HARDW
Brighteners
Zinc and Cadmium
Copper Alloys
Aluminum
Magnesium
Silver
Agents & Dyes

Research can offer you the

most complete data published on CHROMATE CONVERSION COATINGS

In developing new Iridite finishes for corrosion protection, paint-base and appearance, we at Allied have accumulated a wealth of information on chemical treatments for non-ferrous metals.

Because Iridite is the most complete line of chromate conversion coatings available, we naturally feel a certain obligation to the finishing industry. That's why our Research and Development Department is continually studying ways of improving the Iridite coatings, developing new formulations to solve your finishing problems. Each Iridite is engineered to perform a specific function; each is pretested both in our laboratories and in our pilot plant. This experimentation and production testing with manufacturers' sample parts, provide proven processes and an endless source of new data.

Because Iridites are used all over this country, Canada and Mexico, and in principal industrial areas throughout the world, we are also able to obtain first-hand information on new requirements of all types of chemical finishing. This data forms an integral part of Allied's development program. Allied Field Engineers, strategically located to assist manufacturers in determining the Iridite for their jobs and in setting up Iridite installations, are in constant contact with the industry. From the practical standpoint, the value of information obtained from these men is unsurpassed.

Likewise, the information gained relating to industry's other needs in the field of electroplating and related processing enables us to keep the line of ARP Plating Brighteners and Chemicals abreast of current requirements.

FOR YOUR FREE COPY OF THIS REFERENCE FILE, call your nearest Allied Field Engineer . . . he's listed under "Plating Supplies" in your classified phone book. OR, write direct . . . we'll be glad to receive your sample parts for test processing.

ALLIED RESEARCH PRODUCTS
INCORPORATED
4004-06 E. MONUMENT STREET • BALTIMORE 5, MD.

Manufacturers of Iridite finishes for corrosion protection and paint base on non-ferrous metals; ARP Plating Chemicals.

Du-Lite CHEMICAL FINISHING PRODUCTS FOR ALL METALS

bring
your
finishing
problems

Du-Lite

AMERICAN ELECTROPLATERS' SOCIETY
ANNUAL CONVENTION

BOOTH 377—PUBLIC AUDITORIUM,
CLEVELAND, JUNE 20-23, 1955

THE DU-LITE CHEMICAL CORPORATION · MIDDLETOWN, CONN.

point base on non-ferrous metals; ARP Plating Chemicals.

ANNUAL REPORTS

from officers of the

AMERICAN ELECTROPLATERS' SOCIETY

Schaefer

President's Report

THE Presidents of the Society can be likened to a chain of many links with only one link in focus at a time as each passes through the highest office. This chain began with the origin of the Society and, we hope, will stretch into a future filled with growth and progress. The interval of time for each to weld and forge his link is brief. The wealth of Society education, background and experience necessary to render constructive leadership and judgment is acquired by a long and active association with the Society in various capacities prior to election.

Naturally, during the past years on the Executive Board—and this year has been no exception—there have been honest differences of opinion which have been weighed and discussed thoroughly before decisions were reached. During the past year the Society experienced a healthy membership growth with increased financial stability. The foundations for increased services to its members was extended.

The Society is now entering its fourth year at the present Newark location. The Executive Board initiated a renovation program along with some space expansion during the past year. Early in 1955 the Production Office for our publications was moved from Philadelphia to Newark, so that all of our activities are now under one roof. The January issue of PLATING contained an excellent article on the present Headquarters Office and staff. Each of us can be proud of our Headquarters and the congenial atmosphere represented there. Our staff has to a great degree achieved the poise and accomplishment which comes with experience, and the changes of the past few years are rapidly fading into the background.

Several years ago the Executive Board initiated a policy of bringing professionally trained personnel into the Society as vacancies occurred or expansion demanded. The results of this long range policy are now beginning to reap handsome dividends for us.

The "new look" of our magazine, which you probably have observed since the beginning of this year, is one of the many worthwhile achievements made possible by this policy. The future issues will demonstrate even more clearly the professional touch as our personnel gain more experience in our publications and in the metal finishing technology which it represents. From a business point of view our advertising position and prestige continued to advance at a rate which exceeded our most hopeful estimates. Likewise, our membership reflected this healthy growth, while the general financial position of the Society was further strengthened.

The Industrial Finishing Exposition and Convention for 1955 appears to be headed for success. We have been conducting an active attendance promotion campaign of members and nonmembers to assure the continued support of manufacturers and suppliers to our industry. At this writing it is too early to determine the success of this effort.

The appointed members to our Society's standing and permanent committees have all discharged their duties in a most cooperative manner. Without their unselfish contributions the pleasant report which is now being written would not have been possible. The individual reports of these committees and the financial reports of the various Society funds are a part of our message to you—the members and delegates of the Society. I hope that you will study them at your leisure and write or call us on any points which may not be clear. The informed member is the best member.

It has been a distinct privilege and honor to serve as President this past year—one which will carry many pleasant memories for years to come.

R. A. Schaefer

Kelly

First Vice-President's Report

AS SET forth in our constitution and by-laws the educational committee for the Society consists of the branch librarians and the first vice president, who is chairman of the committee. This committee, which should be one of the most important in the Society has, to my knowledge, never functioned. I have re-activated this committee.

It is expected that by this committee assuming their duties, as intended by the writers of the constitution, the branches, through their librarians, will have direct control of the educational activities of the Society.

Many of the librarians, the great majority of whom take their duties quite seriously, have been very helpful in attempting to get the committee working.

This educational committee can outline programs which will assist the branches and give direction to the National Society's efforts. A meeting of the committee will be held during the convention, a report on that meeting will be given at the final business session of the convention.

During the past year I have attended all of the meetings of the Executive Board, I have performed the duties assigned to me and contributed ideas which I felt would contribute to the growth and good of the Society.

As chairman of the committee for investigating the desire and need for broadening the base of the Society's activities I have endeavored to ascertain the wishes of the membership. The majority of the committee is in favor of going rather slow in widening our scope of operations. A desire for more information regarding buffing has been expressed, this may result in a research project on buffing.

It is my recommendation that the matter of broadening our activities be given further study. Now that our national office is well staffed and in capable hands the additional load entailed by broadening could be carried. Possibly it is time for the Society to take a more aggressive stand in this matter in order that we might better serve our present members and others.

I am very grateful for the many suggestions I have received from the members during the past year. These letters are quite helpful, I solicit them.

Clyde Kelly

Heiman

Second Vice-President's Report

PARTICIPATION in the deliberations and work of the Executive Board (which conducts the regular business of the Society and plans for the future) was the main service of your Second Vice-President. The activities of the Board are described in the report of President Schaefer.

The following two specific activities were carried out during the past year: Membership Promotion and the Branch Officers' Manual.

MEMBERSHIP PROMOTION

According to the By-Laws of the Society, the National Second Vice-President is "Chairman of the Membership Committee" and the Branch First Vice-President has "charge of promoting the growth of the membership of the Branch."

To assist branch membership committees and to lend further impetus to the work already being done, the following was done by your Second Vice-President.

1. The membership promotion section of the Branch Officers' Manual submitted by the committee headed by C. Kelly and J. Andrus was completely revised and rewritten and distributed to over 500 officers of all branches. This twenty-one page report gives comprehensive information and recommendations for membership promotion.

2. The leaflet "AES and You," which is an excellent literature piece for membership promotion, was revised prior to its second printing.

3. An illustrated leaflet for membership promotional work dealing specifically with the advantages and benefits of AES membership was prepared and should be printed during the coming year.

4. Letters were written to all Branch First Vice-Presidents and correspondence was exchanged with many of these officers regarding the Society's membership program and the problems of specific branches.

5. Letters and AES literature were sent through National Headquarters office to several hundred prospective members both in the United States and abroad.

The following observations are made after a year's work in this field:

1. Membership promotion is primarily

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a branch function. It depends entirely on alert and progressive promotion within branches.

2. The National Office has supplied branch officers with all the necessary material, information, ideas, methods and procedures needed in this work.

3. Some branches are very active and the results show it. In others, the membership committees need to be reactivated, rejuvenated or both.

4. Responsibility for branch membership promotion rests squarely upon the Branch First Vice-President whose specific duty and responsibility it is. He must appoint, direct and inspire a large and active committee.

5. Our membership growth has not kept pace with membership potential. Prospects are abundantly available because of the major expansions of the industry. The failure of any branch to bring in its share of new members can be construed only as insufficient membership committee effort. The increased benefits from Society membership and the ever-widening appeal of the Society's activities and publications make promotional work easier now than it has ever been.

BRANCH OFFICERS' MANUAL

The remaining sections of the Branch Officers' Manual, which was discussed in my last report, were completed during the past year. The first release to branch officers dealt with Membership Promotion and was sent out in November, 1954. The second release, which includes the sections on the duties of the Secretary, Treasurer and Board of Managers, will be sent out in May, 1955.

Editing and revisions to these reports, as well as the membership promotional material described above, is being done by I. W. Marcovitch, A. Doria, S. Knight and your Second Vice-President. This work is being done as rapidly as possible and will be released as completed. I wish to express the thanks and appreciation of the Society to those who contributed and to those who are editing this Manual; also, to Manson Glover for his work in currently editing and completing, where necessary, the Convention Manual.

Samuel Heiman

Branch	Membership March 31, 1954	Elected	Reinstated	Transferred In	Transferred Out	Resigned	Suspended	Dead	Net Gain	Membership March 31, 1955	Sustaining Membership Credits
Adelaide	42	5	2	—	—	4	1	—	2	44	—
Allentown-Reading	49	7	2	—	1	6	12	—	−10	39	6
Baltimore-Washington	100	11	—	—	—	1	7	—	3	103	5
Boston	140	—	—	—	1	—	2	—	−3	137	4
Bridgeport	151	13	—	—	1	3	8	—	1	152	5
Buffalo	105	7	1	1	2	1	18	—	−12	93	1
Capitol District	—	26	—	19	—	—	—	—	—	45	1
Central Michigan	51	19	—	—	2	4	3	1	9	60	1*
Chicago	483	36	6	4	2	6	24	4	10	493	75
Cincinnati	88	8	—	1	1	2	2	—	4	92	2
Cleveland	246	31	2	5	5	3	16	—	14	260	16
Columbus	60	13	1	1	—	—	1	—	14	74	—
Dallas-Ft. Worth	54	5	—	3	1	3	10	—	−6	48	1
Dayton	87	13	—	2	3	2	6	—	4	91	4*
Detroit[c]	596	122	2	5	4	21	29	3	72	668†	54
Grand Rapids	170	19	—	3	—	2	10	1	9	179	15
Hamilton	28	1	—	—	—	2	1	—	−2	26	4
Hartford	163	12	—	—	—	4	3	—	5	168	4
Houston	42	7	—	3	9	8	6	—	−13	29	1
Indianapolis	115	8	—	1	3	1	7	—	−2	113	3*
Kansas City	46	1	1	—	—	—	—	—	2	48	—
Lancaster	70	—	—	—	1	1	3	3	−8	62	2
Los Angeles	277	21	1	2	3	6	13	1	1	278	17*
Louisville	38	8	1	1	1	5	4	—	—	38	1
Melbourne	168	14	11	—	—	1	31	—	−7	161	—
Milwaukee	175	16	6	1	2	11	4	3	3	178	9
Montreal	88	19	—	—	2	4	23	—	−10	78	1
Newark	276	26	—	4	4	1	28	2	−5	271	15
New Haven	93	11	—	—	—	4	2	—	5	98	4
New York	385	23	3	2	—	2	14	3	9	394	21
Philadelphia	216	22	10	4	2	5	18	1	10	226	9
Pittsburgh	140	18	9	3	3	8	21	—	−2	138	6
Portland	18	10	—	—	—	7	—	—	3	21	—
Providence-Attleboro	92	2	—	—	1	1	—	—	—	92	2
Rochester	98	7	2	1	2	8	7	—	−7	91	4
Rockford	78	6	1	—	—	—	6	1	—	78	—
Saginaw Valley	105	18	1	—	1	6	10	—	2	107	—
St. Joseph Valley	82	9	3	—	2	5	6	—	−1	81	4
St. Louis	84	1	—	—	3	—	—	—	−2	82	11
San Antonio	—	13	—	5	—	—	—	—	—	18	—
San Francisco	74	13	1	—	3	5	3	—	3	77	—
Seattle	—	43	—	4	—	—	12	—	—	35	—
Southeastern	48	7	1	—	—	1	3	—	4	52	1
Southern Tier	—	16	—	—	—	—	—	—	—	16	1
Springfield	67	15	2	1	6	2	9	—	1	68	2
Syracuse	159	10	1	—	38	2	13	—	−42	117	1
Sydney[b]	81	18	3	—	—	1	8	—	12	93	—
Toledo	57	4	—	—	1	—	9	1	−7	50	2
Toronto	136	23	—	1	5	4	10	2	3	139	3*
Twin City	73	9	—	1	—	5	1	—	4	77	2*
Waterbury	135	10	1	—	—	6	6	—	−1	134	15*
Western Ontario	28	3	—	—	—	—	2	—	1	29	3
Wichita[b]	34	14	2	—	—	—	2	—	14	48	1
Member-at-Large	157	32	7	—	6	4	23	2	4	161	—
Totals	6348	825	83	78	121	178	457	28	88	6550	349

*Includes branch contributions.

cWinners in membership competition.

†Does not include 3 members in the armed forces and one student.

Third Vice-President's Report

Eddy

DURING the 1954–1955 AES year, your third vice president has attended the several Executive Board meetings which have been held, participated in many of the decisions affecting the operation of the Society and, basically, learned the methods and functions involved in the business of the Supreme Society of the American Electroplaters' Society.

At the meeting in Chicago, in January, the President directed me to head a committee to determine the future of Branch Exhibits at the National Convention. A report on this subject will be made at the June Convention.

It has been a pleasure to be of whatever service to the Society and to have been associated with all the people who are also interested in the affairs of AES.

Francis T. Eddy

Past President's Report

Swift

FIVE years of pleasant work with fellow members of the Executive Board are now coming to a close.

During this year there have been many crises and many changes which have all required careful thought as well as a great deal of patience. Decisions among the members of the Board have not always been unanimous and your present Past President has occasionally been on the losing side as well as on the deciding side.

None of this has brought anything but benefit to the Society as it is very certain that no one person is ever correct at all times.

You have seen the National Headquarters office and staff grow through many changes to a larger working group operating in increasingly improving surroundings with more and better equipment. This has all led to improved and greater service to you as members.

Printing quality has always been a major problem and while it has been improved substantially, there is still a great deal more to be done in that respect. While it may sound strange, such matters cannot be changed rapidly due to the complexity of the publishing work involved with respect to advertising, research reports, technical articles and general news items. It may take another year to bring this to a satisfactory conclusion.

This past year, your Past President has acted primarily as the senior advisory member working for the improvement of the Society through the ideas of the Junior members.

The time, energy, and money concerned have been well spent during this period and both work and play have been thoroughly enjoyed through the interesting number of friends made in the Society, through visitations to the various Branch functions as well as Conventions and regular Executive Board and Committee meetings.

Your Past President regrets leaving behind the pleasant associations at regular intervals with the other Board members but such is progress. Good and capable hands are still coming forward from all the Branches to be selected by the Delegates. The present ones could not be improved upon for a balanced team.

George P. Swift

Kovatis

Executive Secretary's Report

GENERAL

GENERALLY speaking, the year 1954–1955 was marked by a very favorable economic and membership growth. Important Staff changes, innovations at National Headquarters, improvement of the format of PLATING, increased public relations activity, an expanded research program, pointed up once more that the American Electroplaters' Society was coming of age. A business-minded, progressive-thinking Executive Board, led by President Ralph A. Schaefer, and an able Headquarters team, again proved to be the key to the year's successful operation. The following summaries will show how the Society progressed during the past year.

FINANCIAL

PLATING again proved to be the Society's breadwinner. Of an operating PLATING surplus of $30,329.02, nearly half of this sum ($14,233.33) was used to defray current Society obligations. Increased services to a growing membership, the purchase of essential office equipment and furniture, were the chief reasons for this deficit. Of a $13,261.75 increase in PLATING income over the previous year, $11,657.48 of it was attributed to an improved advertising revenue. Gross advertising income was 7.8 per cent more than last year's figure, or an increase of $11,657.48. Credit for the excellent showing goes to George Burnley, who celebrated his first anniversary with PLATING as Advertising Manager on April 1.

PLATING expenses for the year were up $4,324.31, but we still fared better than last year because of a higher income. Our ratio in 1953–1954, income to expenses, was 1.17 to 1, while in 1954–1955, our ratio increased favorably to 1.23 to 1.

Society income increased 13.4 per cent over last year, but expenditures were also up, with a 41.6 per cent in crease of expenses in 1954–1955. However, it is important to note here that our actual Society income was $1,989.08, or 8.5 per cent more than the budgetal figure ($23,300.00). In addition, of the budgeted expenditure of $43,350.00, a total of $39,522.41 was actually expended. This represents a difference of $3,827.59 or an actual expenditure of 8.8 per cent less than the budgeted figure. Chief reasons for the increased expenditure were: (a) an enlarged Annual Proceedings, (b) procurement of additional equipment and furniture and (c) additional service to a growing membership.

The balance sheet for March 31, 1955, shows our total assets (General Fund) as $248,726.32, and a net worth of $182,465.46. This is an increase of $16,095.69 in our net worth during the year, not including research fund.

PUBLICATIONS

The PLATING print order for the April, 1955 issue was 9,000 and was distributed as follows:

Members:	
Active and Sustaining	7,016
Subscribers	1,042
Advertisers and Exchange	446
Inventory	496
Total	9,000

Despite the fact that no effort was made to promote the sale of new subscriptions, 30 new subscribers were added in 1954–1955. Last year there was a net loss of two subscribers. A total of 25 more pages of advertising were sold this year, and despite our difficulties in obtaining more and better PLATING articles, we have been able to maintain close to a 60–40 ratio (advertising space to editorial space).

Many innovations and improvements were made in PLATING. George Burnley's achievements in the advertising department stand out while Archie Doria's efforts as Editor and Jim Adams' contributions as Production Manager, have been responsible for the "new forward look" of our journal. We appreciate all the fine letters of praise and the many comments about PLATING. We assure you that with your help we can and will make PLATING the leading publication of our field. PLATING continues to play an increasingly important role in the plating and metal finishing industry. More and more advertisers, members and subscribers, bear this out.

PROCEEDINGS: Despite changes in the editorial department, the 41st Annual *Proceedings* was published and in members' hands before Christmas, 1954. A larger edition, *Proceedings* featured an 8 x 11¼ inch cover size and contained 288 pages of material as compared to 154 in 1953.

Total cost of printing *Proceedings* was $14,575.86 or a per member cost of $2.07. This was an increased per member cost of $0.34 over last year's *Proceedings* because of the additional 134 pages. Effective January 1956, however, the Annual *Proceedings* will contain research reports in addition to PLATING articles and convention papers, in accordance with a recent ruling of the Executive Board, in the interests of providing an additional service to members.

BRANCH ACTIVITIES

Three branches received permanent Charters during the year. They were Portland (Oregon), San Antonio (Texas) and Capitol District (New York). Permanent Charters have also been petitioned by Seattle (Washington) and Southern Tier (New York). The total number of Branches, therefore, should reach 53 by May 1, 1955.

We are indeed grateful to members who made the formation of these new branches possible, and especially to Society leaders such as Clyde Kelly and Lindley S. Wood. The latter spearheaded the organization of the Upper New York State branches.

The number of news items appearing

in PLATING showed considerable Branch interest and activity. A total of 241 items were published in addition to more than 30 photographs. Only three branches failed to send in news for publication. Notwithstanding this, there was an increase of 15 branch news items over the previous fiscal year.

EDITORIAL BOARD

One of the most outstanding contributions by the Editorial Board in 1954–1955 was the suggestion to form a committee on style and format. This committee comprised Dr. W. Meyer, Dr. R. Muraca, G. Burnley, Les Diveley, W. Geissman and P. Kovatis. This committee met and formulated ideas and suggestions. They set up the machinery which made possible the improvements in Society publications. The "Tricks of the Trade" column was short-lived because of the lack of articles. However, we are still attempting to stimulate this type of column for the magazine. Les Diveley was appointed Chairman of a committee to organize a booklet which would help in the solicitation of PLATING articles. He is still working on this project, and we hope to realize some tangible results in the foreseeable future from this effort.

We certainly appreciate the efforts by members of the Editorial Board in the furtherance of PLATING improvements. Although not too successful in obtaining articles in the year just ended, we are confident that the Editorial Board will play a more active role in the solicitation of articles for PLATING and papers for Conventions in the future.

HEADQUARTERS

The moving of the Production Office from Philadelphia to Newark was probably one of the most important changes at National Headquarters during the year. At the present time, our Editorial Department, Advertising and Production, are in one office under the same roof with other Headquarters departments. Results of this centralization are already apparent, and we hope by this innovation to give members additional services and a better magazine, to which they are entitled.

During the year, your Secretary attended 15 Branch functions, and attended 20 meetings of various Society boards and committees. In addition, your Secretary has attended meetings of the American Society for Testing Materials, American Trade Association Executives, and the U. S. Chamber of Commerce.

In the interest of promoting better community relations, your Secretary has taken on important local community responsibilities. There has been a need for fostering this kind of relationship where our National Office is located and this need is being met quite favorably on the Society's behalf.

We are gratified by the increased publicity the Society has received in the past year. More than 100 newspapers throughout the country have published articles originating from the National Office. This, of course, is in addition to stories which have appeared in the many magazines.

One word explains our progress during the year—"team-work." The working together for a common objective and the ability to get things done spelled success in 1954–1955. To a devoted, hardworking staff, responsible for an outstanding year, go my heartfelt thanks and appreciation. To the many Society-minded members who have given of their time, money and energy in the furtherance and improvement of the AES, we are profoundly grateful.

My sincere thanks to the Executive Board for their understanding and guidance. Their appreciation of and assistance with the many complex problems which confront an organization such as ours from time to time is appreciated.

P. Peter Kovatis

Serfass

Research Chairman's Report

INTRODUCTION

The several activities of the AES Research Committee have continued at a sustained high rate during the past year. Included among the many activities of the Committee which I shall summarize briefly in this Annual Report are: (1) publication and research reprint report activities, (2) studies of proposed research project proposals, (3) status of the present active research programs, (4) publications status, (5) financial status, (6) plan of the research committee for the year 1955–1956, (7) convention plans.

As a result of this increased activity, and further as a result of earlier efforts of several project directors and project directing subcommittees, the information made available through research papers during the past year has been particularly valuable. We now have seven research projects actively engaged in experimental research. Two new projects are being organized and several more are being contemplated. This expanded program assures the membership of a continued and active research program for the next few years.

PUBLICATIONS AND RESEARCH REPRINTS

Those members who have been following actively the progress of the AES research program will have noted that we have continued the policy of reporting the results of at least one research project each and every month in PLATING. For the past few months in fact two final research reports have been published in each issue of PLATING. In addition to the printing of the research results in PLATING, your committee has arranged for the binding, printing and distribution to sustaining members and others, copies of serial re-

prints of research results. These serial reprints published this year include:

XXV—Disposal of Plating Room Wastes

XXVI—Cleaning and Preparation of Metal for Electroplating

XXVII—Methods for Thickness Testing

XXVIII—Porosity of Electrodeposits

XXIX—Analysis of Plating Solutions

XXX—Effect of Physical Properties of Basis Metal

These reprints are available to members of the Society for a nominal fee as indicated each month on the research page of PLATING.

At present your Editor has a backlog of research papers including several final reports which are to be submitted at the Annual Convention in June. This assures the members of a continued flow of research results from the active projects now engaged in experimental research.

PROPOSALS FOR RESEARCH AND TASK COMMITTEES

During the past year there has been an increasing disposition of research organizations and universities to accept research projects of the type which the AES wishes to conduct. Accordingly, the Research Committee has investigated a number of detailed proposals for initiating research projects as submitted by organizations such as New York University, Michigan State University, University of Pennsylvania Department of Chemistry, Virginia Institute for Scientific Research to name but a few. In accordance with our usual policy, proposals for new research projects as submitted by research organizations and/or members of the Society are reviewed and discussed in detail by special task force committees which are set up by your chairman. During this past year task committees have been appointed and reports have been received on proposals for projects involving microthrowing power; (2) the mechanism of cathode reactions; (3) the study of insoluble anodes; (4) polishing and buffing, and (5) reflectance measurements and surface characterizations.

As a result of the study of these task committee reports, two new projects are being instituted shortly. At the convention meeting action will be taken on several other proposals.

It is heartening to note the increase in interest now being engendered by the AES Research Committee. Although our program is now of an optimum size, we constantly welcome suggestions for the institution of new projects from members of the Society.

PRESENT STATUS OF RESEARCH PROJECTS

PROJECT 2—*Determination of Impurities in Electroplating Solutions*

Although active experimental work has been temporarily terminated on this project, your chairman is continuing the general program of activities by compiling the plating process control handbook. The previous experimental work carried out under Porject 2 will be included in this publication. The results of the work carried out under the joint sponsorship of the Ohio River Valley Water Sanitation Commission and AES Project 2 are now being published in current issues of PLATING.

PROJECT 5—*Effect and Removal of Impurities in Plating Solutions*

Following the passing of Dwight Ewing, director of Project 5, the program was transferred to Professor A. J. Smith. At present there are two fellows active in experimental work involving the effect of manganese and calcium in nickel plating baths.

Project 5 is preparing test panels which will be included in the research exhibit at the annual convention to show the effect of impurities upon physical properties and corrosion.

PROJECT 10—*Disposal of Plating Room Wastes*

This project is now studying the kinetics of the oxidation of cyanide and cyanate ions in solutions. The report covering this problem and a literature survey on the oxidation of cyanide has been prepared. The Society has been fortunate in obtaining a Wellsbach Ozonator for the production of ozone which will be used in the study of ozone as oxidant for the disposal of cyanide.

PROJECT 12—*Cleaning and Preparation of Metals for Electroplating*

Two research fellows are currently carrying on active experimental work on two slightly different projects. Work is progressing on the study of oxide films and separately on oil spreading rates. The relationship of oil spreading rate and the ease of cleaning has been well established for oils that are liquid at room temperature.

A progress report on oil spreading studies is to be presented at the Cleveland Convention. Material is being gathered which will be used in a research exhibit at the convention.

PROJECT 13—*The Nature, Cause and Effect of Porosity on Electrodeposits*

Work on this project has recently consisted of the preparation of suitable test panels for atmospheric exposure testing for the making of replica x-radiographs and prints of each test specimen. Corrosion patterns which develop upon exposure will be compared in detail with the radiographs in order to determine the efficacy of x-radiographing of plated coatings in evaluating test panels.

PROJECT 14—*The Effect of Basis Metal Condition on Plating*

During the past year the study of the influence of inclusions on the corrosion resistance of nickel deposits has continued. The experimental techniques for the program have been well established and rapid progress is expected on this program in the near future.

Project 14 is preparing enlarged photographs of the effect of inclusions which will be included in the research exhibit along with an exhibit of colored slides at the Cleveland Convention.

PROJECT 15—*Accelerated Corrosion Tests*

Work is progressing on the evaluation of the accelerated corrosion tests which were carried out during the past winter. Some twenty-three tests have been outlined and investigated. Of this group, seven have been considered to have sufficient merit to warrant further attention. The main object of Project 15 is to find an accelerated corrosion test which will be similar to outdoor exposure and evaluate the plated coating rather than to attack the coat-

ing itself. Outdoor exposure tests for correlation have been carried out during the past year in the Detroit area on taxi cabs.

Project 15 is supplying panels and equipment that will be exhibited in the Research Booth at the Cleveland Convention. Dr. Walter Pinner, Project Chairman, will deliver a report at the convention.

Table I shows in summary the projects now carrying on active experimental work under the AES research program.

PLANS FOR NEW PROJECTS

As a result of active task committee programs and investigations of new projects, your chairman has succeeded in negotiating grants for new research projects with the Virginia Institute for Scientific Research and the University of Pennsylvania. A new project (16) has been organized at the University of Pennsylvania under the direction of Professor John O'M Bockris. Experimental work will begin in September with Wolfgang Mehl as the research fellow in the field of the study of cathode reaction. The title of this project will be the Mechanism of Electrodeposition. The Project Directing Subcommittee under the chairmanship of Edward Bowerman with the assistance of Dr. William Blum and Otto Kardos, will cooperate with Professor Bockris during the summer to discuss the details of the work on this project. Because of the experience of the men on the research directing subcommittee and more particularly the experience of Professor Bockris and Dr. Mehl in the theory and practice of cathode reaction mechanisms, we look forward with anticipation to the beginning of this new project.

Project 17, which will involve the study of the practical aspects of microthrowing power, has been placed at the Virginia Institute for Scientific Research under Project Director, Dr. Henry Leidheiser. The Project Directing Subcommittee under the chairmanship of Dr. Walter Meyer with the assistance of Arthur DuRose and Robert McKay will confer with Dr. Leidheiser during the summer in anticipation of experimental activity on the project early in September. Because of the reputation and previous work carried out by Dr. Leidheiser in the field of microthrowing power, we feel that the Project Directing Subcommittee will soon be actively engaged in directing a program, the results of which should be far-reaching to the theoretical and practical plater.

Task committees at present are studying the possibility of instituting projects in the study of polishing and buffing, the study of reflectance measurements of surface characterizations of electrodeposits and the study of insoluble anodes used in plating. It is anticipated that reports of these task committees will result in one or more recommendations for activation of new projects.

FINANCES

Your Chairman is glad to report that the financial status of the research program is now a healthy one. For the second year there has been an increase in excess of income over expense. Reference to the auditor's report indicates that a research balance as of March 31, 1955 is now $89,538.22. Although this is the highest research fund balance in the history of the Society, we feel that this reserve fund is adequate assurance to continue the research program at the present rate of expenditure for a period of two years. It has been the objective of the Research Committee for a number of years, to maintain a reserve fund of such magnitude as to permit the continuation of research for a minimum of two years. Such a reserve fund is necessary in order to insure adequately cooperating agencies of the renewal of research projects now in progress.

With the activation of two new projects this year, and the continuation of the present active projects, our expenditures during the next year will increase markedly. Approximately 40,000 dollars will be expended in active prosecution of research projects during the coming year. Accordingly all efforts must be maintained and even increased to obtain subscriptions, sustaining members and other financial activities at a maximum level.

With nine active research projects and an expenditure of approximately $40,000 per year, with a two-year reserve fund of $90,000, your committee feels that the program has reached its optimum size for efficient administration. The Finance Subcommittee under the direction of Robert Racine has been untiring in their efforts to increase the number of sustaining members of the research program. Some difficulty has been experienced in retaining the interest on the part of sustaining members. Efforts on the part of the Finance Subcommittee to improve sustaining member relationship with the Research Committee are now underway. It is anticipated that our collections for research funds will increase somewhat during the next year.

CONVENTION PLANS

In addition to the annual report of the chairman of the Research Committee at the convention, it is anticipated that the results of the research being carried out by two projects will be presented in the form of final reports at the Cleveland Convention. Dr. Henry Linford will report on Project 12's experimental work dealing with oil spreading rates, and Dr. Walter Pinner will outline the results obtained during the past year by the very active committee directing the study of accelerated corrosion tests.

In addition to the research reports, your committee has arranged to present an exhibit booth at the convention, containing a few of the outstanding contributions made by research projects during the past few years. As mentioned earlier in this report, Project 15 will present portions of its program dealing with accelerated corrosion tests and Project 12 will present the advantages of the atomizer test in studying the cleaning of metals.

In closing this report your chairman wishes to thank the many members of the AES who have contributed to the success of the research program during the past few years. In particular, I would like to thank those members who have contributed their services as project directing subcommittee members and task committee members for their success in the improvement of the research program.

EARL J. SERFASS,

SUMMARY OF AMERICAN ELECTROPLATERS' SOCIETY RESEARCH PROJECTS

No.	Location	Project Director	Committee Chairman	Fellow	Subject	Status
2	Lehigh	E. J. Serfass	W. Meyer	None	Plating Process Control Handbook	Active
5	Michigan State	A. J. Smith	L. Borchert	R. J. Rowe R. Bacon	Effect and Removal of Impurities in Nickel Solutions	Active
10	Yale	B. F. Dodge	L. Durney	N. Sondak	Disposal of Plating Room Wastes	Active
12	Columbia	H. Linford	E. Candee	D. Feder P. Grubb	Cleaning/Oxide Effects Oil Spreading Studies	Active
13	Bureau of Standards	F. Ogburn	C. Sample	R. Hilkert	Nature, Cause and Effect of Porosity in Electrodeposits	Active
14	Ontario Research Foundation	N. H. Jones	W. Tucker	Dr. Lu	Effect of Basis Metal Condition on Plating	Active
15	Detroit Area	None	W. Pinner	None	Accelerated Corrosion Tests	Active
16	University of Pennsylvania	J. Bockris	E. Bowerman	Dr. W. Mehl	Mechanism of Electrodeposition	Sept. 1955
17	Virginia Institute for Scientific Research	Dr. H. Leidheiser	W. Meyer	—	Microthrowing Power	July 1955

Cavanaugh

Law Committee Chairman's Report

DURING the past year, the Law Committee has considered and made recommendations on the following items affecting interpretation of our constitution:

(1) Constitutionality of certain branches ruling against suppliers holding office.

(2) Question of the right of branches to set up their own fiscal year.

(3) Revision of the Constitution (Article VIII, Section I and Article V, Section 3) regarding the proper terminology to cover the method of charging for PLATING from the annual dues of each member.

G. W. Cavanaugh

Active Committees 1954-1955

RESEARCH COMMITTEE

Dr. Earl J. Serfass, *Chairman*
Lehigh University

L. C. Borchert, *Vice-Chairman, Research*
Houdaille-Hershey Corporation

R. J. Racine, *Vice-Chairman, Finance*
Wyandotte Chemicals Corporation

Lloyd O. Gilbert
Rock Island Arsenal

Arthur P. Wrisberg
Davies Supply & Manufacturing Co.

E. R. Bowerman
Sylvania Electric Products, Incorporated

Myron B. Diggin
Hanson-Van Winkle-Munning Co.

Arthur H. DuRose
The Harshaw Chemical Co.

Dr. Edward Parker
Technic, Incorporated

EX-OFFICIO MEMBERS

Dr. Ralph A. Schaefer
AES President

P. Peter Kovatis
AES Executive Secretary

HONORARY MEMBERS

Dr. William Blum, Washington, D. C.

LIAISON MEMBERS

R. F. Ledford
AES Representative to ASTM Committee B-8
Industrial Filter and Pump Manufacturing Company

G. E. Best
AES Representative to ASTM Committee D-19
Mutual Chemical Company of America

Clarence H. Sample
AES Research Committee Representative to Committee B-8
The International Nickel Company

FINANCE AND PUBLICITY COMMITTEE

R. J. Racine, *Chairman*
Detroit, Michigan

A. P. Wrisberg, *Vice-Chairman*
St. Louis, Missouri

DISTRICT CAPTAINS

Dr. H. L. Kellner
New England Branches

Arthur Wrisberg
St. Louis, Dallas, Houston, Los Angeles and San Francisco Branches

John Lockerbie
St. Joseph Valley, Indianapolis and Louisiana Branches

Fred Fulforth
Baltimore-Washington and Southeastern Branches

Eugene Combs
Ohio State Branches

Raymond Kotz
Rockford, Twin Cities and Milwaukee Branches

G. W. Cavanaugh
Upstate New York Branches

Robert J. Racine
Michigan State Branches

C. Short
Canadian Branches

M. Nadel
New York and Newark Branches

RESEARCH DIRECTING SUBCOMMITTEE

Leslie C. Borchert, *Chairman*

Clarence H. Sample, *Research Supervisor*
The International Nickel Company, Inc.

Cleve F. Nixon, *Research Supervisor*
General Motors Corporation

Dr. Ralph A. Schaefer, *Research Supervisor*
Clevite-Brush Development Company

Active Committees 1954-1955

PLATING EDITORIAL BOARD

P. Peter Kovatis, *Chairman*

Archimedes Doria, *Vice-Chairman*

Edwin R. Bowerman, Jr., Howard J. McAleer, Formax, Detroit, Mich.; Daniel Gray, Oneida, Ltd., Oneida, N. Y.; Past President Fred Fulforth, United Chrome Corp., Philadelphia, Pa.; Charles W. Ostrander, Allied Research, Baltimore, Md.; Leslie Diveley, Cutler-Hammer, Milwaukee, Wis.; William C. Geissman, National Lock, Rockford, Ill.; Dr. Harold J. Wiesner, Bendix Aircraft, South Bend, Ind.; Robert D. Miller, Electric Auto-Lite, Sharonville, Ohio; Dr. Abner Brenner, Bureau of Standards, Washington, D. C., and John B. Winters, R. W. Renton and Co., Cleveland, Ohio

* * * * *

PAPER AWARD COMMITTEE

B. C. Case, *Chairman*, Sunbeam Corp., Chicago, Ill.
R. A. Wooffter, Jones-Laughlin Steel Corp., Pittsburgh, Pa.
Q. O. Shockley, Allison Division, General Motors Corp., Indianapolis, Ind.

* * * * *

AES CREDENTIALS COMMITTEE

Past President F. J. MacStoker, *Chairman*, Farrand Optical Co., Bronx, N. Y.
Past President George Wagner, Hy-Grade Electro Plating Co., Newark, N. J.
Charles Temple, Globe Slicing Machine Co., Inc., Stamford, Conn.

* * * * *

LAW COMMITTEE

G. W. Cavanaugh, *Chairman*, General Electric Co., Syracuse, N. Y.
D. G. Foulke, Hanson-Van Winkle-Munning Co., Matawan, N. J.
E. Roth, Roth Plating Corporation, South Bend, Ind.

* * * * *

PLATING STAFF

P. Peter Kovatis, *Executive Secretary and Managing Editor*
Archimedes Doria, *Editor*
H. George Burnley, *Advertising Manager*
James C. Adams, *Production Manager*

NECROLOGY

The following members have died during the year. Many of them contributed greatly to the advancement of the Society. Branches and friends mourn their passing.

Central Michigan Branch: Carl H. Massuch
Chicago Branch: H. Allen George, Paul H. Krause, Harry O. Schuessler
Detroit Branch: L. R. Eastman, Ernest L. Beightol, Jr.
Grand Rapids Branch: William Whitney
Lancaster Branch: C. E. Brubaker, J. R. Gasten, R. Hoenstine
Los Angeles Branch: Edwin Williams
Milwaukee Branch: Nicholas Di Cesare, Omer N. Doyle, L. Joseph Moyes
Newark Branch: Jules Homa, John Kotches
New York Branch: Joseph Lerner, Ernest Feldman, William Fischer, John Sterling
Philadelphia Branch: Eugene Light
Rockford Branch: Claude L. Richardson
Toledo Branch: Edward St. Arnaud
Toronto Branch: John Acheson, H. A. Smith
Members-at-Large: Erwin Sohn, Joplin, Missouri

American Electroplaters' Society
445 Broad Street
Newark 2, New Jersey

We have examined the balance sheets of the General Fund and Research Fund of American Electroplaters' Society, Incorporated (New Jersey Corporation) as of March 31, 1955, and the related statements of income and funds for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

The accompanying balance sheets and statements of income are exclusive of certain accounts described in the notes appended thereto.

In our opinion, the accompanying balance sheets and statements of income, except as indicated above, present fairly the financial position of American Electroplaters' Society, Incorporated at March 31, 1955, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Clyde A. Zukswert & Co.
Certified Public Accountants

Newark, N. J.
April 18, 1955

Financial Statement of the Supreme Society of the American Electroplater's Society, Inc.

GENERAL FUND—COMPARATIVE BALANCE SHEET—MARCH 31, 1955 AND 1954

ASSETS:	*1955*	*1954*	*Increase Decrease**
Current Assets:			
Demand deposits	$ 53,349.18	$ 61,195.11	$ 7,845.93*
Time deposits	130,000.00	75,000.00	55,000.00
Petty Cash	50.00	70.00	20.00*
United States Treasury bonds:			
Series K	9,690.00	9,850.00	160.00*
3¼%, 6/15/83–78 (at cost)	15,682.20	15,682.20	
Accounts receivable:			
Advertising, books, reprints and supplies	3,835.13	4,973.34	1,138.21*
Per Capita tax		247.16	247.16*
Conventions	336.14	75.62	260.52
Other	75.00	10.00	65.00
Total accounts receivable	$ 4,246.27	$ 5,306.12	$ 1,059.85*
Advances to Industrial Finishing Exposition Committee, Cleveland		$ 2,078.69	$ 2,078.69*
"Society" Control current account (contra)		265.90	265.90*
Total current assets	$213,017.65	$169,448.02	$ 43,569.63
Deposits:			
Copyright office	$ 48.00		$ 48.00
American Airlines	425.00	$ 425.00	
Postage	354.77	416.71	61.94*
Total deposits	$ 827.77	$ 841.71	$ 13.94*
"PLATING" Investment Account (contra)	30,000.00		30,000.00
Deferred charges:			
Process control handbook	$ 1,800.00		$ 1,800.00
Heussner medals	80.90		80.90
	$ 1,880.90		$ 1,880.90
Carl E. Heussner Award Fund	$ 3,000.00	$ 3,000.00	
Total assets	$248,726.32	$173,289.73	$ 75,436.59

LIABILITIES AND FUND			
Current Liabilities:			
Payroll deductions	$ 853.35	$ 455.72	$ 397.63
Advertising advance payments		2,898.36	2,898.36*
Foreign advances	23.57	23.57	
"PLATING" Control current account (contra)		265.90	265.90*
Research Fund (contra)		167.25	167.25*
Total current liabilities	$ 876.92	$ 3,810.80	$ 2,933.88*
Advances, Cleveland Exposition 1955, Net	$ 32,247.88		$ 32,247.88
"PLATING" Investment Account (contra)	30,000.00		30,000.00
Carl E. Heussner Award Fund	3,136.06	3,109.16	26.90
General Fund, Exhibit D	182,465.46	166,369.77	16,095.69
Total liabilities and fund	$248,726.32	$173,289.73	$ 75,436.59

NOTE: The above Comparative Balance sheet does not include all inventories of publications, literature and supplies, office furniture and equipment, accounts payable and prepaid and accrued expenses.
(EXHIBIT A)

PLATING

Assets and Liabilities included in the above Balance Sheet

March 31, 1954

CURRENT ASSETS	
Demand deposits	$ 21,644.68
Accounts receivable:	
Advertising, books, reprints and supplies	3,612.81
Investment account	30,000.00
Deposits:	
Copyright office	48.00
Postage	31.10
Total Assets	$ 55,356.59
LIABILITIES AND FUND	
Current liabilities:	
Payroll deductions	$ 408.68
General Fund, Exhibit D	54,947.91
Total liabilities and fund	$ 55,356.59

Comparative Statement of Income - General Fund - "Society" Control for the Years Ended March 31, 1955 and 1954

	1955	1954	Increase Decrease*
INCOME			
Sales:			
"Proceedings"	$ 1,425.90	$ 1,352.22	$ 73.68
Books and reprints	20.00	723.76	703.76*
Glasstone book	57.22	90.00	32.78*
Branch supplies	516.06	113.28	402.78
Total sales	$ 2,019.18	$ 2,279.26	$ 260.08*
Per capita tax (Pro rata share)	16,705.84	16,109.41	596.43
Member-at-large dues (Pro rata share)	1,009.31	909.66	99.65
Sustaining membership dues (Pro rata share)	1,815.85		1,815.85
Interest on investments	3,367.66	2,731.68	635.98
Miscellaneous income	371.24	266.39	104.85
Total income	$ 25,289.08	$ 22,296.40	$ 2,992.68
EXPENSES			
"Proceedings" expense	$ 14,575.86	$ 10,596.22	$ 3,979.64
Copyright expense		4.00	4.00*
Books and reprints purchased		524.17	524.17*
Glasstone book royalties	7.20	7.80	.60*
Branch supplies	292.35	77.01	215.34
Taxes, excise		37.60	37.60*
Salaries (Pro rata share)	11,102.68	10,868.67	234.01
Special services rendered (Pro rata share)		385.18	385.18*
Traveling expense (Pro rata share):			
Executive secretary	1,363.07	710.14	652.93
Officers	1,470.41	1,761.58	291.17*
Officers' office expense	39.84	106.14	66.30*
Furniture and fixtures and office equipment (Pro rata share)	599.22	461.51	137.71
Furniture and fixtures repairs (Pro rata share)	55.26	6.50	48.76
Alterations and repairs—office (Pro rata share)	228.38		228.38
Headquarters' office expense (Pro rata share)	4,398.16	3,738.91	659.25
Public relations (including branch officers' manual)	4,764.03	2,781.23	1,982.80
Miscellaneous branch expense (Note 1)	625.95		625.95
Meetings expense (Note 2)		345.86	345.86*
Total expenses	$ 39,522.41	$ 32,412.52	$ 7,109.89
NET OPERATING DEFICIT	$ 14,233.33	$ 10,116.12	$ 4,117.21
Other income charge—Convention Expense		315.02	315.02*
Gross Deficit	$ 14,233.33	$ 10,431.14	$ 3,802.19
Other Income—Philadelphia Convention		2,320.42	2,320.42*
Net Deficit Transferred to General Fund	$ 14,233.33	$ 8,110.72	$ 6,122.61

NOTES:

1. Miscellaneous branch expense increased to maintain inventory of pins, reports, supplies, etc.
2. Meetings expense apportioned to traveling expense accounts for year ended March 31, 1955.

(EXHIBIT B)

Plating Account

	1955	*1954*	*Increase Decrease**
INCOME			
Advertising	$158,779.35	$147,121.87	$ 11,657.48
Less:			
Discounts allowed	2,524.06	2,435.90	88.16
Agency commission	20,823.78	20,323.33	500.45
Total	$ 23,347.84	$ 22,759.23	$ 588.61
Net	$135,431.51	$124,362.64	$ 11,068.87
Sales:			
Monthly publication	5,028.54	5,810.20	781.66*
Reprints	3,009.07	2,413.90	595.17
Miscellaneous	1,177.90	634.82	543.08
Per capita tax (Pro rata share)	12,418.97	11,976.79	442.18
Member-at-large dues (Pro rata share)	343.96	545.79	201.83*
Sustaining membership (Pro rata share)	1,344.90		1,344.90
Interest on investments	251.04		251.04
Total income	$159,005.89	$145,744.14	$ 13,261.75
EXPENSES			
Salaries (Pro rata share)	$ 30,617.08	$ 25,261.89	$ 5,355.19
Salary and commissions, advertising manager	10,769.58	17,253.33	6,483.75*
Monthly publication expense:			
Printing costs	61,194.47)		
Other costs	5,767.61)	65,212.89	1,749.19
Copyright expense	44.00	48.00	4.00*
Reprint purchases	2,062.03	841.90	1,220.13
Special services rendered (Pro rata share)		521.63	521.63*
Traveling expense:			
Advertising manager	2,530.02	258.64	2,271.38
Managing editor (Pro rata share)	346.19	581.08	234.89*
Editor	638.61	560.33	78.28
Production manager	177.68	101.30	76.38
Officers (Pro rata share)	1,443.62	1,528.71	85.09*
Promotional advertising expense	1,635.60	1,268.42	367.18
Furniture and fixtures and office equipment (Pro rata share)	1,840.32	2,837.35	997.03*
Furniture and fixtures repairs (Pro rata share)	43.98	59.00	15.02*
Alterations and repairs—Office (Pro rata share)	269.00		269.00
Headquarters' office expense	9,297.08	8,018.09	1,278.99
Total expenses	$128,676.87	$124,352.56	$ 4,324.31
EXCESS OF INCOME OVER EXPENSES	$ 30,329.02	$ 21,391.58	$ 8,937.44

(Exhibit C)

SUMMARY

	Society Account	*"Plating" Account*	*Total*
Total income	$ 25,289.08	$159,005.89	$184,294.97
Total expenses	39,522.41	128,676.87	168,199.28
Net (Deficit) or Income Transferred to General Fund	$(14,233.33)	$ 30,329.02	$ 16,095.69

Statement of General Fund Account for the Year Ended March 31, 1955

BALANCE, April 1, 1954	$166,369.77	
ADD		
Excess of income over expenses, "PLATING" Control, for the year ended March 31, 1955, per Exhibit C	30,329.02	
Total		$196,698.79
DEDUCT:		
Net deficit, "Society" Control, for the year ended March 31, 1955, per Exhibit B		14,233.33
BALANCE, MARCH 31, 1955 (Exhibit D)		$182,465.46

Research Fund
Comparative Balance Sheet
March 31, 1955 and 1954

	1955	*1954*	*Increase Decrease**
ASSETS			
Current Assets:			
Demand Deposits	$ 22,572.82	$ 54,801.78	$ 32,228.96*
Time Deposits	67,000.00	20,075.00	46,925.00
Accounts receivable	26.40	12.90	13.50
General Fund, "Society" Control, contra		167.25	167.25*
Total Assets	$ 89,599.22	$ 75,056.93	$ 14,542.29
LIABILITIES AND FUND			
Current Liabilities:			
Payroll tax deductions	$ 61.00	$ 47.32	$ 13.68
RESEARCH FUND, PER EXHIBIT F	89,538.22	75,009.61	14,528.61
Total liabilities and fund	$ 89,599.22	$ 75,056.93	$ 14,542.29

(Exhibit E)

Research Fund Comparative Statement of Income for the Years Ended March 31, 1955 and 1954

	1955	1954	Increase Decrease*
INCOME			
Sustaining membership dues and subscriptions (Pro rata share)	$ 30,039.25	$ 34,050.00	$ 4,010.75*
Per capita tax (Pro rata share)	6,209.48	5,988.39	221.09
Member-at-large dues (Pro rata share)	172.11	181.93	9.82*
Sales of reprints	593.71	806.18	212.47*
Interest on investments	1,287.53	662.50	625.03
Miscellaneous income	408.61	656.40	247.79*
Total income	$ 38,710.69	$ 42,345.40	$ 3,634.71*
EXPENSES			
Transfer to Canadian Research Fund	$ 3,936.29	$ 5,231.50	$ 1,295.21*
Project Payments to institutions	6,200.00	4,384.91	1,815.09
Project directors and associates	11,692.54	5,075.69	6,616.85
Reprints purchased	1,530.44	1,505.42	25.02
Supplies	419.69	102.26	317.43
Social security tax	73.73	32.15	41.58
Traveling expense (including meeting expense)	43.62	143.97	100.35*
Miscellaneous expense	285.77	138.28	147.49
Total expenses	$ 24,182.08	$ 16,614.18	$ 7,567.90
EXCESS OF INCOME OVER EXPENSES	$ 14,528.61	$ 25,731.22	$ 11,202.61*
RESEARCH FUND, BALANCE APRIL 1	75,009.61	49,278.39	25,731.22
RESEARCH FUND, BALANCE MARCH 31	$ 89,538.22	$ 75,009.61	$ 14,528.61

(Exhibit F)

Canadian Research Fund

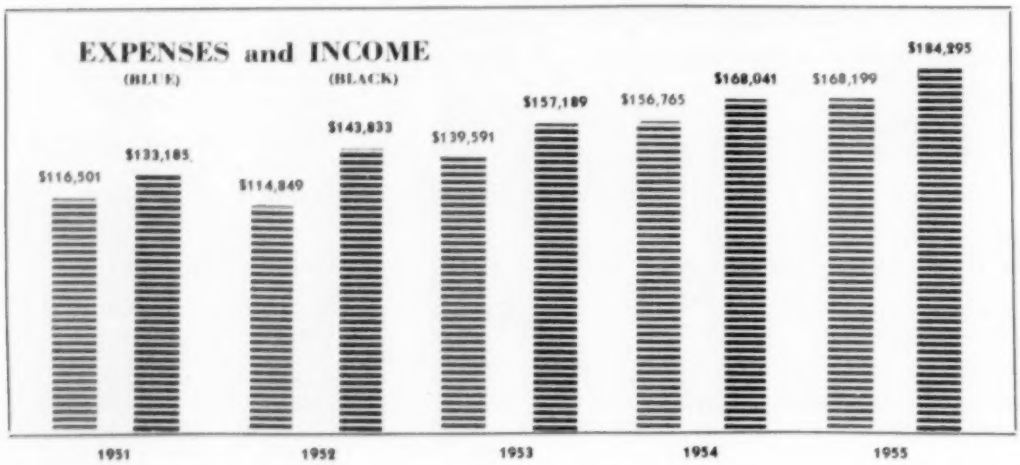
Comparative Statement of Receipts and Disbursements for the Years Ended March 31, 1955 and 1954

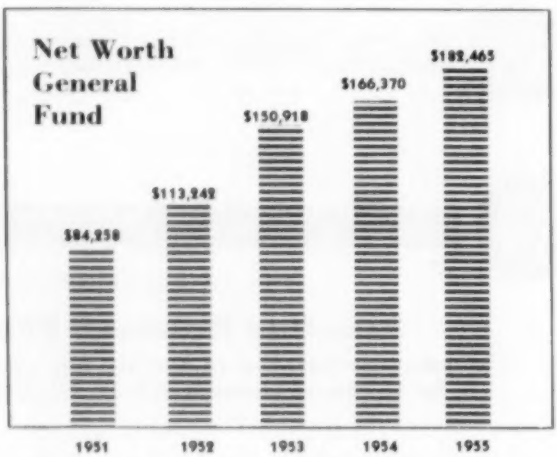
	1955	1954	Increase Decrease*
BALANCE, April 1 (Dominion Bank, Toronto, Canada)	$ 1,975.05	$ 941.64	$ 1,033.41
RECEIPTS			
American Electroplaters Society, Research Fund	$ 3,936.29	$ 5,231.50	$ 1,295.21*
Toronto Branch	151.00		151.00
Western Ontario Branch	100.00		100.00
Sustaining membership dues	1,825.00	1,900.00	75.00*
Interest	26.80	2.73	24.07
Total receipts	6,039.09	7,134.23	1,095.14*
Total	$ 8,014.14	$ 8,075.87	$ 61.73*
DISBURSEMENTS			
Ontario Research Foundation	$ 5,745.00	$ 6,030.64	$ 285.64*
Discount and exchange	148.56	70.18	78.38
Total disbursements	$ 5,893.56	$ 6,100.82	$ 207.26*
BALANCE, March 31, (Dominion Bank, Toronto, Canada)	$ 2,120.58	$ 1,975.05	$ 145.53

(Exhibit G)

5 Year Comparative Statistics

(Combined "Society" and "Plating" Accounts)





***Includes branch members, members-at-large and single firm memberships.**

Sustaining Membership List

As of April 15, 1955 (Figures in parenthesis indicate number of memberships held)

UNITED STATES

Accurate Electro-Plating, Inc.
Philadelphia, Pa. (Phil)
Acme Galvanizing, Inc.
Milwaukee, Wis. (Milw)
Acme Plating Company, The
Cleveland, Ohio (Clev)
Acme Steel Company
Chicago, Ill. (Chic)
Adolph Plating, Inc.
Chicago, Ill. (Chic)
Advance Plating Company, The
Cleveland, Ohio (Clev)
Aetna Electroplating Company, Inc.
Philadelphia, Pa. (Phil)
Alert Supply Company
Los Angeles, Calif. (L.A.)
Allen-Bradley Company
Milwaukee, Wis. (Milw)
Allied Research Products, Inc.
Baltimore, Md. (Bal-W)
Allis-Chalmers Mfg. Co.
Milwaukee, Wis. (Milw)
Alsop Engineering Corporation
Milldale, Conn. (Htfd)
Aluminum Company of America
New Kensington, Pa. (Pitt)
American Anodizing & Plating Company
Chicago, Ill. (Chic)
American Brass Co., The
Waterbury, Conn. (Wtby)
American Buff Company
Chicago, Ill. (Chic)
American Cabinet Hardware Corporation
Rockford, Ill. (Chic)
American Can Company
Maywood, Ill. (Chic)
American Chemical Paint Company
Ambler, Pa. (Phil)
American Electro Products, Inc.
Waterbury, Conn. (Wtby)
American Instrument Company
Silver Spring, Md. (Bal-W)
American Nickeloid Company
Peru, Ill. (Chic)
American Phenolic Corp.
Cicero, Ill. (Chic)
American Radiator & Standard Sanitary Corporation
Louisville, Ky. (Lvlle)
American Smelting & Refining Company
So. Plainfield, N. J. (Nwk)
American Wire Fabrics Corporation
Mt. Wolf, Pa. (Lanc)
American Zinc Institute (5)
New York, N. Y. (N.Y.)
Apex Plating Company
Chicago, Ill. (Chic)
Apollo Metal Works
Chicago, Ill. (Chic)
Ardco, Incorporated
Chicago, Ill. (Chic)
Arrow-Hart & Hegeman Electric Co.
Hartford, Conn. (Htfd)
Arrow Plating Company, Inc.
Chicago, Ill. (Chic)
Arvin Industries, Inc.
Columbus, Ind. (Indpls)
Associated Plating Company
Los Angeles, Calif. (L.A.)
Atlas Plating Works
Cicero, Ill. (Chic)
Auto City Plating Company
Detroit, Mich. (Detr)
Automotive Rubber Company
Detroit, Mich. (Detr)
Autoyre Company, Inc.
Oakville, Conn. (Wtby)
M. E. Baker Company
Cambridge, Mass. (Bost)
Bart Laboratories Company, Inc.
Belleville, N. J. (Nwk)
Bart-Messing Corporation
Belleville, N. J. (Nwk)
Bastian-Blessing Company, The
Chicago, Ill. (Chic)
Beacon Supply Company
Chelsea, Mass. (Bost)
Belke Manufacturing Company
Chicago, Ill. (Chic)
Bell & Howell Company
Chicago, Ill. (Chic)
Bell Telephone Laboratories, Inc.
Murray Hill, N. J. (Nwk)
Bendix Prods. Div., Bendix Aviation Corp.
So. Bend, Ind. (St. Jo)
Berteau-Lowell Plating Works
Chicago, Ill. (Chic)
Bethlehem Steel Company (2)
Bethlehem, Pa. (Al-Rd)
Big Ben Petroleum Products Co.
Chicago, Ill. (Chic)
Blakeslee, G. S. & Company
Cicero, Ill. (Chic)
Bruce Products Corporation
Howell, Mich. (Detr)
Buckeye Products Company, The
Cincinnati, Ohio (Cinc)
Buckingham Products Company
Detroit, Mich. (Detr)
California Rack Company
South Gate, Calif. (L.A.)
Chandeysson Electric Company
St. Louis, Mo. (St. L.)
Chase Brass & Copper Company
Waterbury, Conn. (Wtby)
Chemical Corporation, The
Springfield, Mass. (Spfd)
Chicago Electro-Platers Institute
Chicago, Ill. (Chic)
Chicago Roller Skate Company
Chicago, Ill. (Chic)
Chicago Thrift-Etching Corp.
Chicago, Ill. (Chic)
Christie Plating Company
Groton, Conn. (N.H.)
Chrome-Rite Company (2)
Chicago, Ill. (Chic)
Chromium Corporation of America
New York, N. Y. (Chic)
Chromium Process Company, The
Derby, Conn. (N.H.)
Chrysler Corporation (2)
Detroit, Mich. (Detr)
Clevite-Brush Development Company, Division of Clevite Corporation
Cleveland, Ohio (Clev)
Clinton Company, The
Chicago, Ill. (Chic)
Codman, F. L. & J. C., Company
Rockland, Mass. (Bost)
Continental Can Company, Inc.
Coffeyville, Kansas (Wich)
Corona Corporation
Jersey City, N. J. (Nwk)
Cowles Chemical Company, The
Cleveland, Ohio (Clev)
Crane Company
Chicago, Ill. (Chic)
Croname, Incorporated
Chicago, Ill. (Chic)
Crown City Plating Company
Pasadena, Calif. (L.A.)
Crown Cork & Seal Company
Baltimore, Md. (Bal-W)
Crown Rheostat & Supply Company
Chicago, Ill. (Chic)
Cutler-Hammer Company
Milwaukee, Wis. (Milw)
Darco Dept., Atlas Powder Company
New York, N. Y. (N.Y.)
Davies Supply & Manufacturing Company
St. Louis, Mo. (St. L.)
Diamond Alkali Company
Cleveland, Ohio (Clev)
Diversey Corporation, The
Chicago, Ill. (Chic)
Dixie Electro Plating Company
Houston, Texas (Hstn)
Doehler-Jarvis Corporation (2)
Grand Rapids, Mich. (Gr R)
Donald Sales & Mfg. Company
Milwaukee, Wis. (Milw)
R. R. Donnelley & Sons Company
Chicago, Ill. (Chic)
E. I. duPont de Nemours & Co., Inc.
Wilmington, Del. (Bal-W)
Duro-Chrome of Chicago, Inc.
Chicago, Ill. (Chic)
Eastern Electroplating Co.
Terryville, Conn. (Wtby)
Eastman Kodak Company (2)
Rochester, N. Y. (Roch)
Eaton Manufacturing Company
Cleveland, Ohio (Clev)
Ekco Products Company
Chicago, Ill. (Chic)
Electric Auto-Lite Company, The (2)
Toledo, Ohio (Tldo)
Electro Glo Company
Chicago, Ill. (Chic)
Electrolux Corporation
Old Greenwich, Conn. (Bdpt)
Enthone, Inc.
New Haven, Conn. (N.H.)
Felt & Tarrant Manufacturing Company
Chicago, Ill. (Chic)
Finishing Publications, Inc.
Westwood, N. J. (Nwk)
Folding Carrier Corp.
Oklahoma City, Okla. (Unasgnd)
Ford Motor Company (5)
Dearborn, Mich. (Detr)
Formax Manufacturing Company
Detroit, Mich. (Detr)
Frigidaire Div., General Motors Corp.
Dayton, Ohio (Dayt)
P. B. Gast Company
Grand Rapids, Mich. (G Rr)
General American Transportation Corp.
Kanigen Division
Chicago, Ill. (Chic)
General Electric Company
Schenectady, N. Y. (Cap Dist)
Research Laboratories Division, General Motors Corporation (5)
Detroit, Mich. (Detr)
Gerity-Michigan Corporation
Adrian, Mich. (Detr)

SUSTAINING MEMBERSHIP LIST

Gorham Manufacturing Company
Providence, R. I. (Prov-A)
Graham, Crowley & Associates, Inc.
Chicago, Ill. (Chic)
Graham Plating Works
Chicago, Ill. (Chic)
L. F. Grammes & Sons, Inc.
Allentown, Pa. (Al-Rd)
Grand Rapids Plating Company
Grand Rapids, Mich. (Gr R)
Grand Steel Company
Clawson, Mich. (Detr)
Great Lake Industries, Inc.
Chicago, Ill. (Chic)
Gumm, Frederick, Chemical Company
Kearny, N. J. (Nwk)

C. Hager & Sons Hinge Mfg. Co.
St. Louis, Mo. (St. L.)
Hall-Mack Company
Los Angeles, Calif. (L.A.)
Hamilton Watch Company
Lancaster, Pa. (Lanc)
Hammond Machinery Builders, Inc.
Kalamazoo, Mich. (Gr R)
Hanson-Van Winkle-Munning Co. (3)
Matawan, N. J. (Chic & Nwk)
Harding Manufacturing Company
Detroit, Mich. (Detr)
Hardwood Line Manufacturing Company
Chicago, Ill. (Chic)
Harshaw Chemical Company, The (3)
Cleveland, Ohio (Clev)
Heil Process Equipment Corporation
Cleveland, Ohio (Clev)
Houdaille-Hershey Corporation (2)
Detroit, Mich. (Detr)
Howard Plating Industries, Inc.
Royal Oak, Mich. (Detr)
Hudson Motor Car Company
Detroit, Mich. (Detr)
R. O. Hull & Company, Inc.
Rocky River, Ohio (Clev)
Hy-Grade Electroplating Company
Newark, N. J. (Nwk)

Industrial Filter & Pump Mfg. Co.
Chicago, Ill. (Chic)
Industrial Stamping & Mfg. Co., Division of Vinco Corp.
Detroit, Mich. (Detr)
International Business Machine Corp.
Endicott, N. Y. (S. Tier)
International Nickel Co., Inc. (5)
New York, N. Y. (N.Y.)
International Silver Company
Meriden, Conn. (Wtby)

James Plating Works, Inc.
Chicago, Ill. (Chic)
Jervis Corporation
Grandville, Mich. (Gr R)

Kaybar, Inc.
Hazel Park, Mich. (Detr)
Kaynide Div., Kraft Chemical Co.
Chicago, Ill. (Chic)
Keeler Brass Company
Grand Rapids, Mich. (Gr R)
Kelite Products, Inc.
Chicago, Ill. (Chic)
Kelly Plating Company, The
Cleveland, Ohio (Clev)
Knape & Vogt Manufacturing Company
Grand Rapids, Mich. (Gr R)
Knapp-Monarch Company
St. Louis, Mo. (St. L.)
Knight Plating Company
Detroit, Mich. (Detr)
Kocour Company
Chicago, Ill. (Chic)
Kohler Company
Kohler, Wis. (Milw)

Lane Plating Works
Dallas, Texas (Da-Ft W)
Lasalco, Inc.
St. Louis, Mo. (St. L.)
B. Lavin and Sons, Inc.
Chicago, Ill. (Chic)
Lea Manufacturing Company, The
Waterbury, Conn. (Wtby)
Lea-Ronal, Inc.
Long Island City, N. Y. (N.Y.)
Leeds & Northrup Company
Philadelphia, Pa. (Phil)
Levco Metal Finishers, Inc.
Long Island City, N. Y. (N.Y.)
Chas. F. L'Hommedieu & Sons Company
Chicago, Ill. (Chic)
Line Material Co.
South Milwaukee, Wis. (Milw)
Lyon, Inc.
Detroit, Mich. (Detr)

Maas & Waldstein Company
Newark, N. J. (Nwk)
W. D. MacDermid Chemical Company
Bristol, Conn. (Wtby)
MacDermid, Incorporated
Waterbury, Conn. (Wtby)
Magnuson Products Corporation
Brooklyn, N. Y. (N.Y.)
R. C. Mahoney
Detroit, Mich. (Detr)
P. R. Mallory & Company, Inc.
Indianapolis, Ind. (Indpls)
Manderscheid Company, The
Chicago, Ill. (Chic)
Matchless Metal Polish Company, The
Chicago, Ill. (Chic)
Mattatuck Manufacturing Company
Waterbury, Conn. (Wtby)
Maurer Supply Company
St. Louis, Mo. (St. L.)
McGean Chemical Company, The
Cleveland, Ohio (Clev)
Meaker Company, The
Chicago, Ill. (Chic)
Mechanical Plating Company
Chicago, Ill. (Chic)
Mercil Plating Equipment Company
Chicago, Ill. (Chic)
B. Mercil & Sons Plating Company
Chicago, Ill. (Chic)
Metalcraft Corporation
Chicago, Ill. (Chic)
Metal Mouldings Corporation
Detroit, Mich. (Detr)
Metal Processing Company
Chicago, Ill. (Chic)
Michigan Bumper Corporation
Grand Rapids, Mich. (Gr R)
Michigan Chrome & Chemical Company
Detroit, Mich. (Detr)
Midwest Chrome Process Company
Detroit, Mich. (Detr)
Milhorn Chemical & Supply Co.
Los Angeles, Calif. (L.A.)
J. C. Miller Co., Div. of H-V W-M Co.
Grand Rapids, Mich. (Gr R)
Milwaukee Plating Company
Milwaukee, Wis. (Milw)
Minneapolis-Honeywell Regulator Co.
Minneapolis, Minn. (Tw Cty)
Mitchell-Bradford Chemical Co., The
Bridgeport, Conn. (Bdpt)
Modern Plating Company
Los Angeles, Calif. (L.A.)
Modern Plating Company, The
Chicago, Ill. (Chic)
Modern Plating Corporation
Freeport, Ill. (Chic)
Moore Drop Forging Company
Springfield, Mass. (Spfd)
Motor Products Corporation
Detroit, Mich (Detr)
Mutual Chemical Company of America
Baltimore, Md. (Bal-W)

George L. Nankervis Company
Detroit, Mich. (Detr)
National Aniline Div., Allied Chemical & Dye Corporation
New York, N. Y. (N.Y.)
National Brass Company
Grand Rapids, Mich. (Gr R)
National Cash Register Company
Dayton, Ohio (Dayt)
National Lock Company
Rockford, Ill. (Rock)
National Rejectors, Inc.
St. Louis, Mo. (St. L.)
National Screw and Manufacturing Co.
Cleveland, Ohio (Clev)
Nelson Chemicals Corporation
Detroit, Mich. (Detr)
New England Plating Company, Inc. (2)
Worcester, Mass. (Htfd)
New Jersey Zinc Company (3)
Palmerton, Pa. (Al-Rd)
George E. Nichols Plating
Los Angeles, Calif. (L.A.)
G. J. Nikolas & Company, Inc.
Bellwood, Ill. (Chic)
Northwest Chemical Company
Detroit, Mich. (Detr)
Northwestern Plating Works
Chicago, Ill. (Chic)

Oakite Products, Inc. (2)
New York, N. Y. (N.Y.)
Oakman Plating Company
Van Dyke, Mich. (Detr)
Oneida, Ltd.
Oneida, N. Y. (Syr)
F. D. Pace Company
Grand Rapids, Mich. (Gr R)
Packard Motor Car Company
Detroit, Mich. (Detr)
Palumbo Brothers, Inc.
Newark, N. J. (Nwk)
Pan Ormond Corp.
Ormond Corp.
Ormond Beach, Fla. (SE)
Pennsylvania Salt Mfg. Co.
Philadelphia, Pa. (Phil)
Perlick Brass Co.
Milwaukee, Wis. (Milw)

SUSTAINING MEMBERSHIP LIST

Perma Line Rubber Products Corp.
Chicago, Ill. (Chic)

Philadelphia Rust-Proof Company
Philadelphia, Pa. (Phil)

Philco Corporation
Philadelphia, Pa. (Phil)

Platers Supply Company
Cleveland, Ohio (Clev)

Platers Technical Service, Inc.
Chicago, Ill. (Chic)

Plating Institute of Michigan, The
Detroit, Mich. (Detr)

Plating Service Company
Chicago, Ill. (Chic)

Precision Castings Company of Michigan
Kalamazoo, Mich. (Gr R)

Preston Products Co.
Grand Rapids, Mich. (Gr R)

Price-Pfister Brass Manufacturing Co.
Los Angeles, Calif. (L.A.)

Products Finishing
Cincinnati, Ohio (Cinc)

Pronat Division, Poor & Company
Waukegan, Ill. (Chic)

Racine Plating Co., Inc.
Racine, Wis. (Milw)

Radio Corp. of America
Camden, N. J. (Phil)

Reed Plating Company
Detroit, Mich. (Detr)

Regent Metal Products, Inc.
Brooklyn, N. Y. (N.Y.)

Reilly Plating Company
Melvindale, Mich. (Detr)

Reliable Plating Rack Co.
Schiller Park, Ill. (Chic)

R. W. Renton & Company
Cleveland, Ohio (Clev)

Reynolds Company, The
Philadelphia, Pa. (Phil)

Richardson-Allen Corporation
College Point, L. I., N. Y. (Chic)

Roberts Rouge Company
Stratford, Conn. (Bdpt)

G. S. Robins & Company
St. Louis, Mo. (St. L.)

Roth Plating Corporation
South Bend, Ind. (St. Jo)

Roto-Finish Company
Kalamazoo, Mich. (Gr R)

Royal Plating & Polishing Company, Inc.
Newark, N. J. (Nwk)

Scientific Control Laboratories
Chicago, Ill. (Chic)

Scovill Manufacturing Company
Waterbury, Conn. (Wtby)

J. P. Seeburg Corporation
Chicago, Ill. (Chic)

E. E. Seeley Company, Inc.
Bridgeport, Conn. (Bdpt)

Sel-Rex Precious Metals, Inc.
Belleville, N. J. (Nwk)

Seymour Mfg. Company
Seymour, Conn. (Wtby)

J. J. Siefen Company
Detroit, Mich. (Detr)

Siegel Robert Plating Company
St. Louis, Mo. (St. L.)

Solventol Chemical Products, Inc.
Detroit, Mich. (Detr)

Sommers Brothers Mfg. Company
St. Louis, Mo. (St. L.)

Sparkler Manufacturing Company
Mundelein, Ill. (Chic)

C. D. Sparling Co.
Detroit, Mich. (Detr)

Spence Electro Plating Company
Los Angeles, Calif. (L.A.)

Standard Nickel-Chromium Plating Co.
Los Angeles, Calif. (L.A.)

Standard Plating Rack Company
Chicago, Ill. (Chic)

Standard Plating Works
Goshen, Ind. (St. Jo.)

Standard Steel Spring Division
Rockwell Spring and Axle Co. (3)
Coraopolis, Pa. (Pitt)

Stanley Works, The
New Britain, Conn. (Htfd)

Stevens, Frederic B., Inc. (2)
Detroit, Mich. (Detr)

Studebaker Corporation, The
So. Bend, Ind. (St Jo)

George A. Stutz Manufacturing Company
Chicago, Ill. (Chic)

Summit Finishing Co.
Thomaston, Conn. (Wtby)

Sunbeam Corporation
Chicago, Ill. (Chic)

Superior Steel Company
Detroit, Mich. (Detr)

Surface Alloys, Inc.
Huntington Park, Calif. (L.A.)

Sylvania Electric Products, The
Bayside, N. Y. (N.Y.)

Ther Electric & Machine Works
Chicago, Ill. (Chic)

Thomas Strip Div., Pittsburgh Steel Co.
Warren, Ohio (Clev)

Turco Products, Inc.
Los Angeles, Calif. (L.A.)

Udylite Corporation, The (3)
Detroit, Mich. (Detr)

United-Carr Fastener Corporation
Cambridge, Mass. (Bost)

United Chromium, Inc. (2)
New York, N. Y. (Detr & N.Y.)

United Manufacturing Company
Chicago, Ill. (Chic)

United Platers, Inc.
Detroit, Mich. (Detr)

United States Spring & Bumper Company
Los Angeles, Calif. (L.A.)

Van Der Horst Corporation of America
Olean, N. Y. (Bflo)

Virtue Bros. Mfg. Company
Los Angeles, Calif. (L.A.)

Wagner Brothers, Incorporated
Detroit, Mich. (Detr)

Walton & Lonsbury
Attleboro, Mass. (Prov-A)

Waterbury Companies
Waterbury, Conn. (Wtby)

Waterbury Plating Company
Waterbury, Conn. (Wtby)

Weirton Steel Company
Weirton, W. Va. (Pitt)

Western Electric Company, Inc.
Chicago, Ill. (Chic)

Western Rust Proof Company
Chicago, Ill. (Chic)

Westinghouse Electric Corp.
Pittsburgh, Pa. (Pitt)

Whitfield Chemicals
Detroit, Mich. (Detr)

Whyco Chromium Co., Inc.
Thomaston, Conn. (Wtby)

Wildberg Brothers Smelting and Refining Company
Los Angeles, Calif. (L.A.)

S. K. Williams Company
Milwaukee, Wis. (Milw)

Winchester Repeating Arms Company
New Haven, Conn. (N.H.)

Wollensak Optical Company
Rochester, N. Y. (Roch)

Wyandotte Chemicals Corp.
Wyandotte, Mich. (Detr)

Yankee Metal Products Corporation
Norwalk, Conn. (Bdpt)

CANADA

Armalite Company, Ltd.
Toronto, Ont. (Tor)

Behr-Manning (Canada) Ltd.
Brantford, Ont. (Ham)

Bendix-Eclipse of Canada, Ltd.
Windsor, Ont. (W Ont)

Bonnc Electrotype Co., Ltd.
Toronto, Ont. (Tor)

Canada Cycle & Motor Co., Ltd.
Weston, Ont. (Tor)

Canadian General Electric Co., Ltd.
Peterborough, Ont. (Tor)

Canadian Hanson & Van Winkle Company, Ltd.
Toronto, Ont. (Tor)

Canadian Motor Lamp Company, Ltd.
Windsor, Ont. (W Ont)

Canadian Westinghouse Co., Ltd.
Hamilton, Ont. (Ham)

Dominion Foundries & Steel, Ltd.
Hamilton, Ont. (Ham)

Houdaille-Hershey of Canada, Ltd.
Oshawa, Ont. (Tor)

International Nickel Company of Canada
Toronto, Ont. (Tor)

Lea Manufacturing Company of Canada
Toronto, Ont. (Tor)

Ontario Steel Products Co., Ltd.
Chatham, Ont. (W Ont)

Steel Company of Canada, Ltd., The
Hamilton, Ont. (Ham)

Union Screen Plate Co. of Canada, Ltd.
Montreal, Quebec (Mont)

United Chromium, Ltd.
Toronto, Ont. (Tor)

W. W. Wells, Ltd.
Toronto, Ont. (Tor)

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Warner & Swasey's chromium plating installation features a power-packed line-up of five Rapid Selenium Rectifiers. It's Rapid power, then, along with extensive know-how and other excellent equipment that helps Warner & Swasey turn out only quality chromium plating which is in keeping with their reputation for building the finest of precision, metal-turning machine tools.

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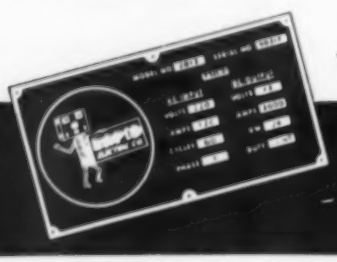

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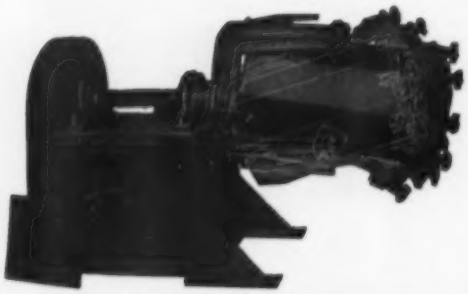

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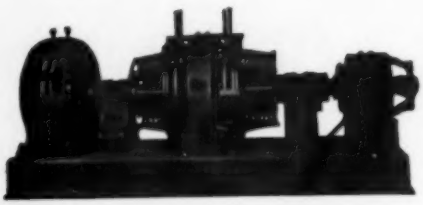

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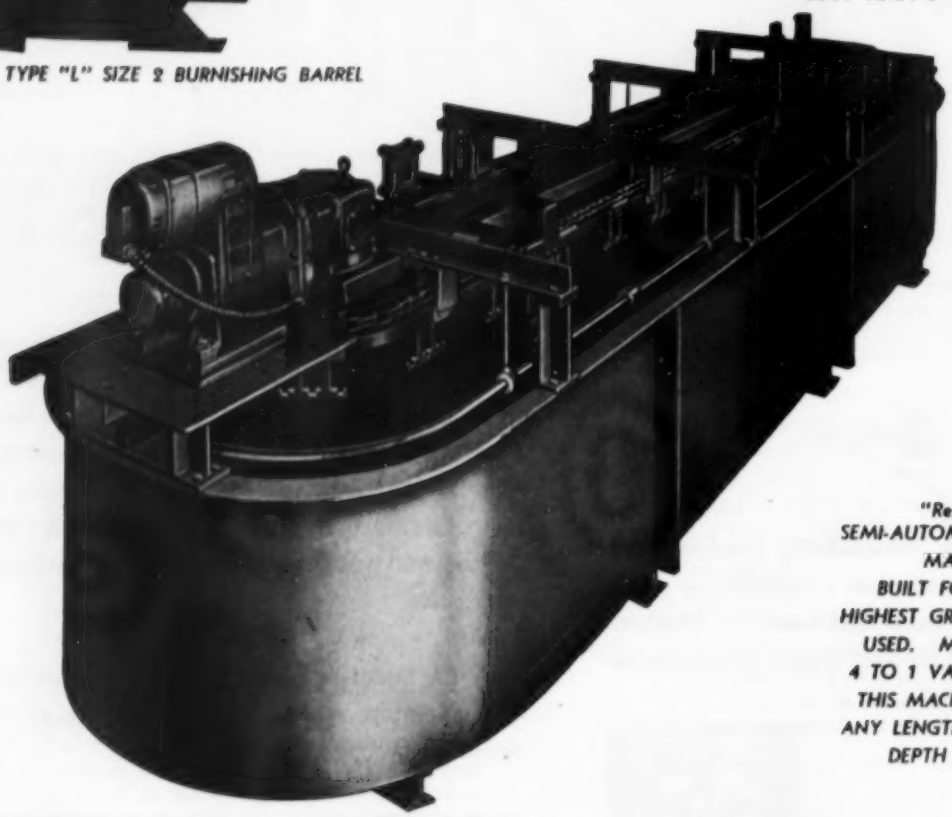

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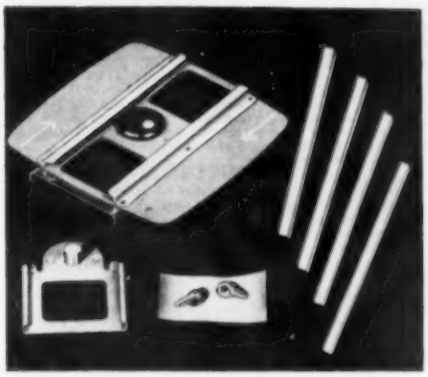

JUST A FEW of the 175 different kinds of parts Argus processes with HONITE Barrel Finishing Method.

Argus Cameras, Inc., Ann Arbor, Michigan, had been using barrel finishing since 1945—processing 175 different kinds of zinc, aluminum and steel camera parts such as those shown above. Last year HONITE Field Engineer D. J. Jones supervised a change to the HONITE Barrel Finishing Method.

Sample results? Recommended HONITE procedure helped cut finishing time on zinc die-cast levers from 36 hours to 15 hours—a time-saving of 58%. Costs of deburring and polishing aluminum camera-case castings were reduced from $.118 per unit to $.059.

Now—the company has found that the HONITE method cuts costs, increases production on intricate parts of all sizes. As many as 500,000 parts are processed weekly.

Your HONITE Field Engineer or nearby HONITE Distributor is a barrel finishing expert who can help *you* cut barrel finishing costs, too. Call him today!

Remember, too, the HONITE Division of the 3M Company supplies a *complete line* of abrasives, chips, compounds and equipment for every barrel finishing need. For complete information about HONITE products, write for free copy of booklet, "Facts and Figures Report on HONITE Barrel Finishing".

MINNESOTA MINING AND MFG. CO.
Dept. PM-55, St. Paul 6, Minn.

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NAME.....TITLE.....

COMPANY.....

CITY.....ZONE...STATE.....

TYPE OF PRODUCTS TO BE FINISHED.....

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An extruded tubing especially suited for use on straight or bent contact wires, and for selective plating of simple parts.

MICCROTEX . . .
A synthetic air-dry rack coating for all plating cycles and phosphate coatings—highly resistant to all plating solutions.

MICCROSTOP . . .
For masking of machined parts for all plating cycles. Hairline demarcation . . . extreme accuracy.

MICCROMASK . . .
For masking of machined parts for hard chromium plating. Provides complete protection—assures extreme accuracy.

MICCROPEEL . . .
Specifically designed to supply the need for a stop-off lacquer that can be peeled easily from the part after plating, and will hold a hairline demarcation through all plating cycles.

MICCROLAC . . .
Mirror-finish, water-white lacquer that protects and beautifies the finest of polished or plated metals.

MICCROSTRIP "A"...
A blend of the new fast solvents for the quick, easy removal of stop-off lacquers in selective plating.

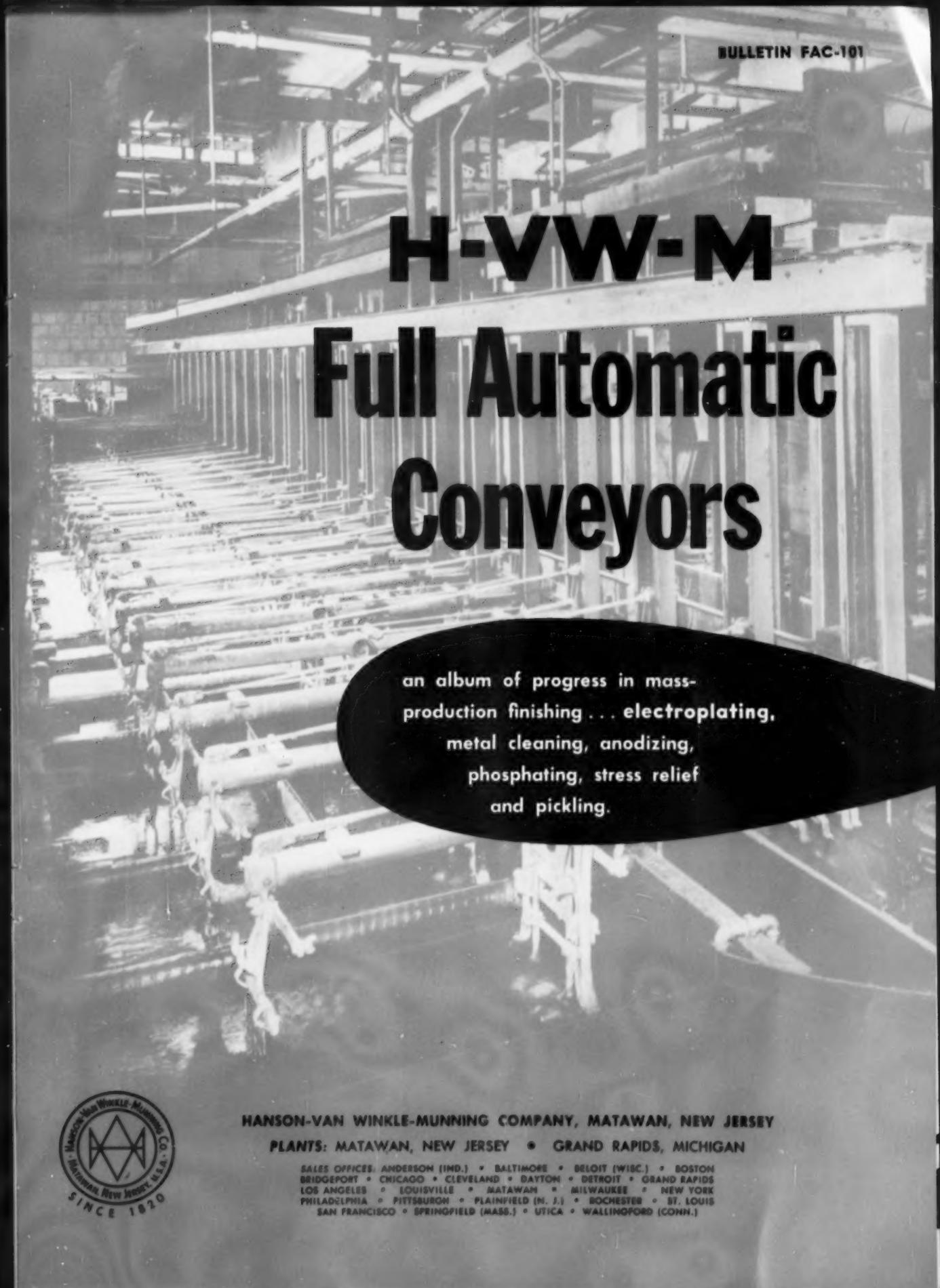
MICCROLOID . . .
Industrial corrosive-resistant coating for use on all plating equipment, rinse tanks, structural steel, walls, floors, pipe lines, air ducts, etc.

MICCROWAX . . .
Two widely used waxes for selective stop-off, especially suited for masking on complicated parts and sharp edges. C-562 for hard chromium; C-600 for high-temperature cycles.

● *Samples and descriptive literature of all Miccro Products will be sent upon request.*

MICHIGAN CHROME
AND CHEMICAL COMPANY

8615 Grinnell Avenue, Detroit 13, Michigan



BULLETIN FAC-101

H-VW-M Full Automatic Conveyors

an album of progress in mass-production finishing . . . **electroplating,** metal cleaning, anodizing, phosphating, stress relief and pickling.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, NEW JERSEY

PLANTS: MATAWAN, NEW JERSEY • GRAND RAPIDS, MICHIGAN

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PHILADELPHIA • PITTSBURGH • PLAINFIELD (N. J.) • ROCHESTER • ST. LOUIS
SAN FRANCISCO • SPRINGFIELD (MASS.) • UTICA • WALLINGFORD (CONN.)

Hanson-Van Winkle-Munning Co. Matawan, New Jersey, U.S.A. SINCE 1820

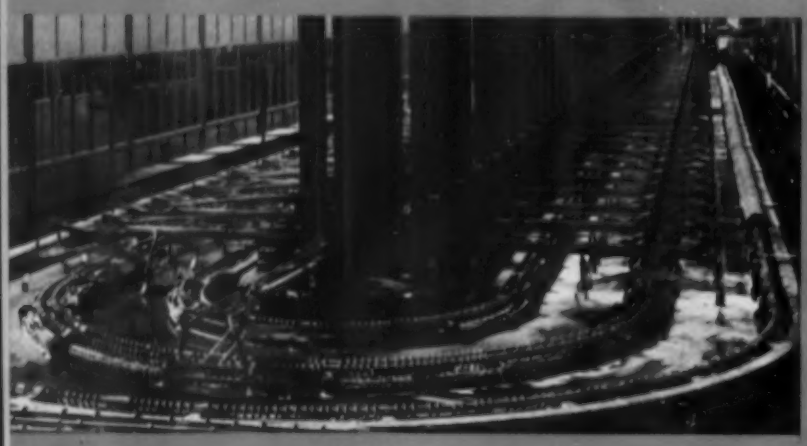
There's an H-VW-M full automatic conveyor for every production application requiring automatic cycling of individual treatments through tanks including:

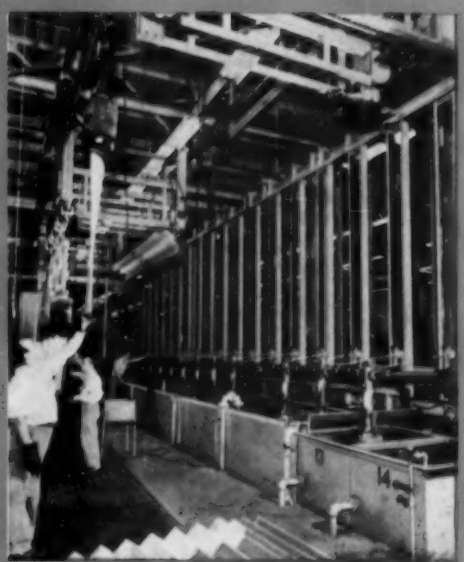
electroplating
metal cleaning
anodizing
phosphating
stress relief
and pickling

The requirements of the inorganic metal finishing industry place a premium on the operational flexibility, broad range of application, and the engineered precision of its equipment. Recognizing this, H-VW-M design engineers have placed special emphasis on incorporation of all of these features—in maximum degree—in H-VW-M full-automatic metal processing conveyors.

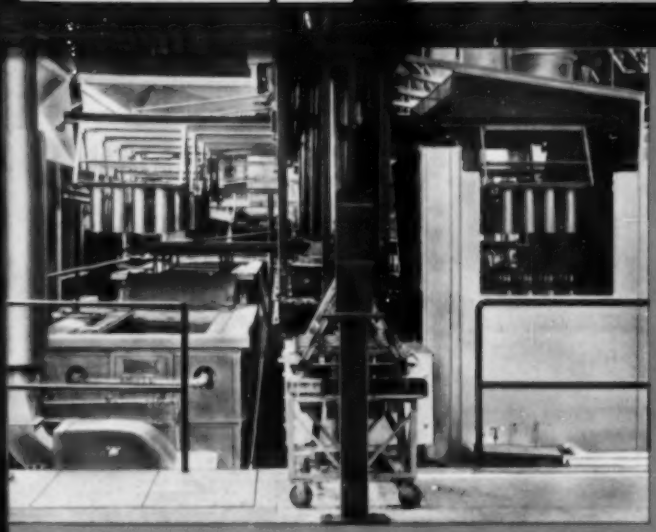
Check the following pictures and their brief story-captions carefully, for they have been particularly selected to indicate the scope of application of H-VW-M Full Automatic Conveyors. *Right here* are the performance-proved, engineered answers to a host of common problems in volume metal finishing.

from the largest to the smallest . . . in processing parts and automotive steel stampings this full automatic plating conveyor takes 'em all. This one machine has an operating solution capacity of 84,000 gallons—one of the world's largest for a single unit.

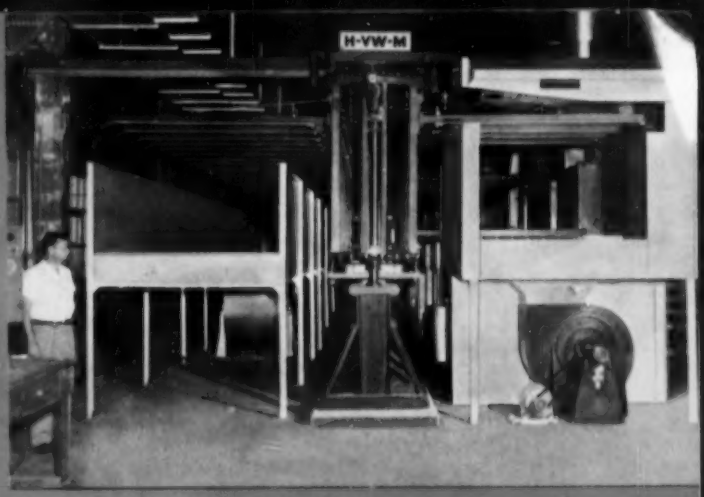




highest lift . . . for a return type conveyor, raising 300-lb. steel propeller blades a full ten feet during zinc plating cycle. To obtain correct blade balance and heavy zinc deposit, the blade transfers automatically to auxiliary conveyor chain for required recycling and automatic reload.

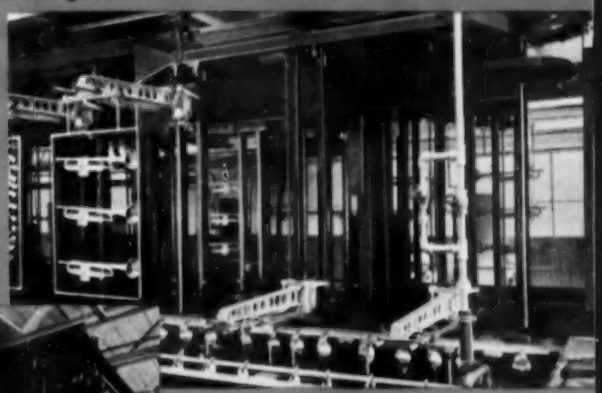


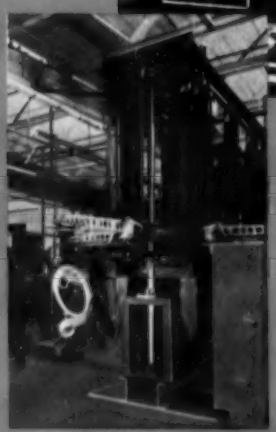
automation in stress relief . . . as well as other treatments can be accomplished through intermittent cycling, as with these steel shell cases which move between oil bath (left) and hot-air blast dryer. *Automatic loading* from and into the same truck, shown in foreground.



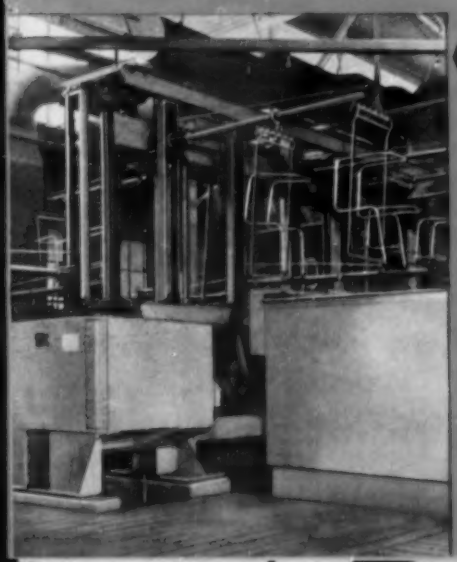
then to paint prep . . . where another H-VW-M conveyor cleans and pickles, drys and cools these same 300-lb. carrier loads of shell cases prior to spray painting. A typical return-type full-automatic does the job, loading and unloading at opposite end of conveyor. Cooler at left, 300°F. dryer at right.

where precision is paramount . . . and minute tolerances of a uniform deposit must be maintained on each separate part, each carrier operates independently. Proper instruments, variable resistors, bi-polar circuits, and mechanical agitation of work in solution are all handled through independent controls on each carrier, as shown in inset.



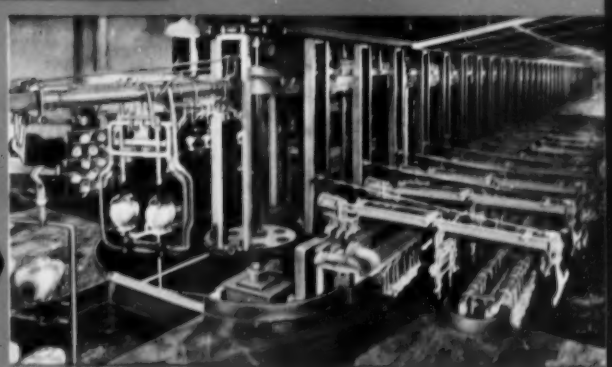


variable load capacity . . . is an essential when the same machine handles musical instruments of all shapes and sizes. Note the interior anode arrangement designed to allow complete plating of the all-important bellmouth. Inset shows a complex-shaped Sousaphone after heavy silver deposit.



adaptable for bulky loads . . . this high-lift, full-automatic conveyor handles clumsy, tubular steel furniture frames with ease. Notice the long arms, with adequate spacing between them to accommodate the bulkiest and most irregular shapes.

plating versatility . . . is the answer to the plating requirements of these attractive modern coffee makers. Like many other holloware appliances they are plated inside and outside by separate circuits. Notice the internal anode feature on the racks, and current collector fingers at the framework end of the arms.



SPECIAL FEATURES MAKE THE DIFFERENCE

Outstanding operating and construction features are the big reasons behind the supremacy of the H-VW-M Full Automatic Conveyor. Engineered for the broadest possible range of product and treatment application, these features produce the *important* differences in conveyor operation—the characteristics of versatility, adaptability, and flexibility that are vital to high speed and high quality production.

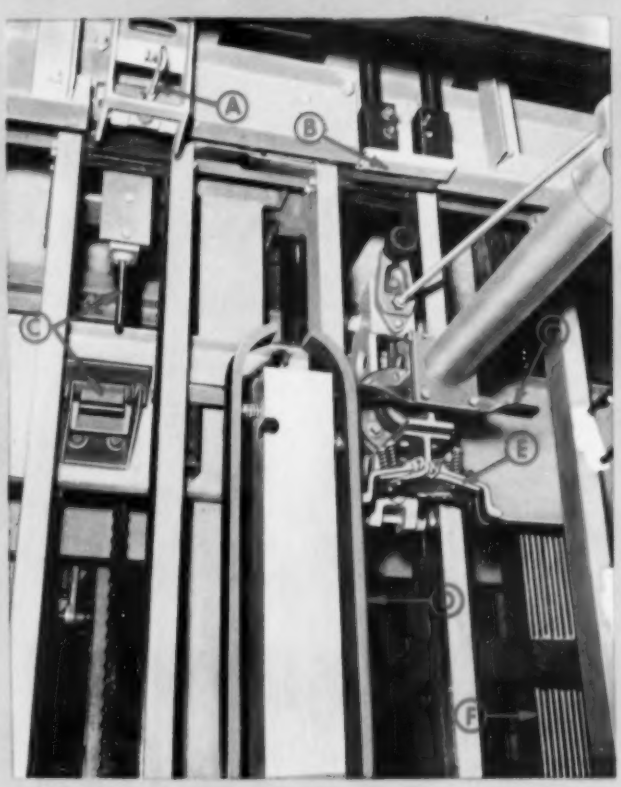
In this close-up view of the carrier arm assembly, a number of important construction features are visible.

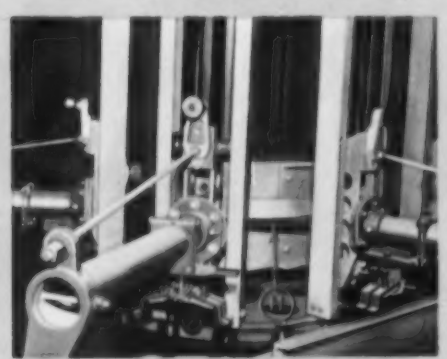
The Manual Reset Flipper (A) and the Bridge Flipper (B) set in the overhead "by-pass" track make possible the important by-pass feature of the conveyor. This feature allows carriers to skip any given station while in the elevated position. Available to operate manually or automatically, this by-pass feature provides flexibility in treatment sequences where individual steps in a process are to be eliminated. Also tanks and solution can be serviced without the need of an interruption in production because of this by-pass feature. Point (C) shows the Standard Flipper that closes to receive carrier for the vertical motion. The spring-loaded pin *positively* locks this flipper, preventing uncontrolled carrier descent.

Another feature of the equipment is the manner in which it safeguards the work from any other than the highest quality treatment. A primary factor in this respect is the special arrangement for ensuring the presence of a partial flow of current as the work approaches the bath. Hot Leads (D) are contacted by the Collectors (G) of the assembly during the vertical transfer so that the instant the work reaches the bath, true, positive plating takes place.

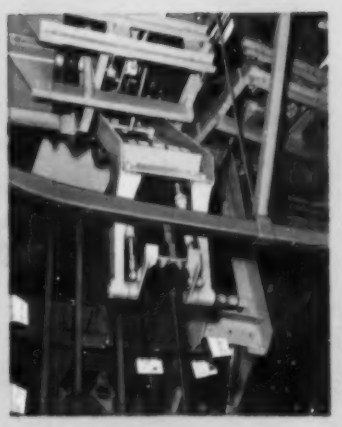
Self-lubricating and spring-tensioned, the Collector Unit (E) is used for both positive and negative DC current, either one of which may be necessary for certain plating steps in the overall operation. Baths requiring separate circuits may be stationed side by side, emphasizing the conveyor's adaptability.

An additional feature is the construction and location of the low voltage Bus Bar (F). Brought up through the center of the conveyor, it is out of the way, and its open construction permits substantially shorter bus runs.





The rugged pipe-arm carrier is shown here at the down position. Point (H), visible between two vertical channels, is the Elevator Lifting Track, a *first* with H-VW-M. Raising carriers at all transfer points by means of track or flipper makes possible a wide scope of applications unlimited by space, height, weight, or lift.



Here is how H-VW-M solved the problem of automatically transferring racks from monorail to plating conveyor, from high to lower level. Other types available for all transfer requirements.

With the H-VW-M Full Automatic Conveyor, many in-process variations are easily made involving adjustments to the work, to the carriers, to the process used, or to other parts of the conveyor itself.

H-VW-M

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

***Plants:* Matawan, New Jersey • Grand Rapids, Michigan**

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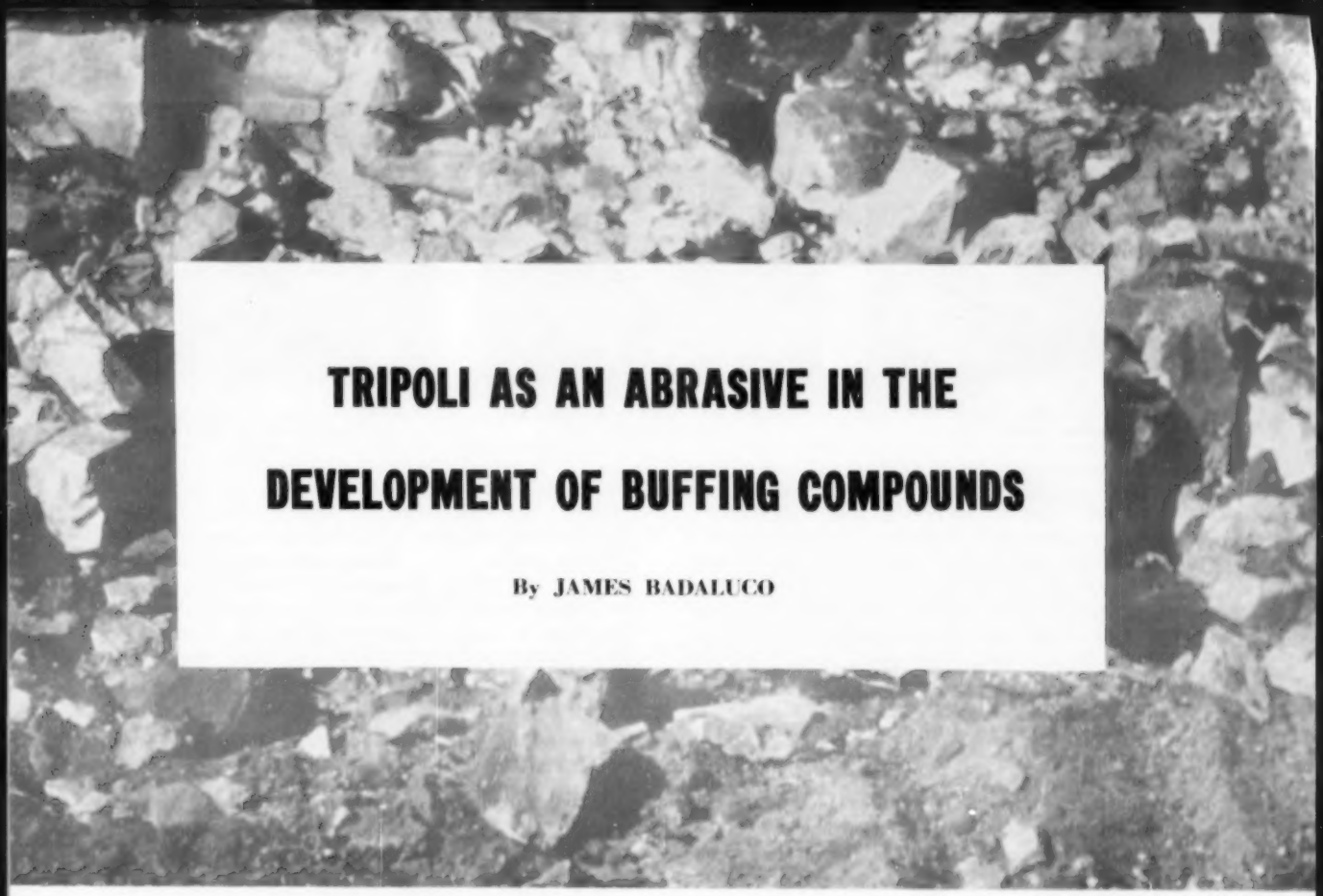
Printed in U.S.A.



TRIPOLI AS AN ABRASIVE IN THE DEVELOPMENT OF BUFFING COMPOUNDS

By JAMES BADALUCO

THE form of tripoli as generally known in the metal finishing industry is "Pure Seneca Standard Tripoli." This is so termed because it is found only within a small area located near Seneca, Missouri, mined by the American Tripoli Corporation, Division of the Carborundum Company.

So far as is known, there is no other deposit of similar nature anywhere in the world. This natural abrasive is an unusual form of silica possessing unique physical properties. The word "tripoli" in the past as well as the present has been used too loosely. Considerable confusion has existed as to what constitutes tripoli. Due to the similarity of names, tripolite, a type of diatomaceous earth found originally in Tripoli in Northern Africa, has been erroneously called tripoli. Tripoli, however, contains no diatoms, the distinguishing characteristic of diatomaceous earth. The material mined in the Missouri-Oklahoma area has been considered by the trade to be the proper abrasive type material, and many feel that the term "tripoli" could more properly be restricted to the product of this region. Another nonmetallic mineral with similar chemical analysis is a siliceous material, mined in several states such as Alabama, Arkansas, Georgia, southern Illinois, Mississippi, and Tennessee. These deposits produce a very soft silica material primarily labeled amorphous silica. Still another material mined in Pennsylvania is called "Rottenstone." This material is somewhat heavier in unit weight and lower in silica content than the above mentioned products. Seneca Tripoli differs from all of these by its unusual particle structure and physical properties.

"Seneca Standard Tripoli" has a combination of properties which make it invaluable to the buffing compound industry. One of the outstanding characteristics is the physical structure of the individual particle.

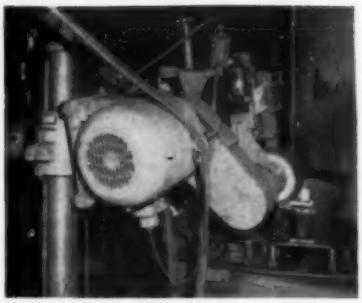
This structure is often described as micro- or cryptocrystalline, yet it borders on the amorphous character. The crude rock can be crushed easily by hand. The individual grains, however, have a hardness sufficient to scratch steel. As abrasion pressure is applied, it will break down into smaller particles offering new cutting edges. Thus as applied to buffing compounds, the wheel life and the effective cutting characteristics are prolonged. Due to the fact that tripoli is still quite soft and rather friable, it offers the best cutting action on the softer metals such as copper, brass, aluminum and zinc.

Another outstanding quality of tripoli is its extremely high rate of absorption due to the porous and fibrous structure of the fine particles. A block of the crude tripoli will absorb more than 1/3 its weight in water, yet in a few days' time at room temperature the tripoli will become quite dry. Its oil absorption is still higher, being 48–52 per cent by weight. This oil affinity permits a unique bond between the abrasive particles and the grease binders used in the various formulations. This feature also adds to the cutting ability of certain buffing compositions by insuring adequate lubrication to both the buffing wheels and the abrasive particles.

The Seneca Standard Tripoli deposits are of a sedimentary nature lying in horizontal beds just below the surface

Automatically buffing bumper bars at Oldsmobile, Lansing, Mich.

Polishing saw housings at Black and Decker, Towson, Ind.



Automatic buffing of portable electric saw housings at Black and Decker

of the ground. They remain in their original state as they have not been subjected to appreciable faulting, folding, or crushing. The deposits are the residual product of weathering and occur in massive form, either blocky or in friable masses. Some geologists theorize that tripoli is the end product of the weathering of siliceous limestones; although this is somewhat of a controversial point. During the original geological period of formation, the percolating surface waters have descended through the beds contributing to some of the properties of the tripoli. These waters, it is believed, have washed out the alkali salts leaving behind the very porous structure. Also, the variance of color from light cream to dark rose is due to the amounts of iron carried down into the beds. The cream colored deposits usually lie underneath a hard nonpermeable layer of shale or a flint seam which has not allowed the iron salt solutions to pass through. The rose variety contains about 2 per cent iron oxide, while the cream tripoli has less than ½ of 1 per cent. Except for the iron content, there is no appreciable difference in the various grades of tripoli except in particle size. Chemically, tripoli is practically pure silica, as it contains from 92 to 98 per cent silica or silicon dioxide. The remainder is mostly ignition loss and small quantities of alumina, iron, lime, soda and potash. The percentage of free quartz or crystalline silica in Seneca Tripoli is less than ½ of 1 per cent. The amount of moisture in processed Tripoli is nearly nil. Chemical composition, however, is much less important in actual use than physical characteristics.

The American Tripoli Corporation deposits at Seneca are large and very uniform in quality. The process for obtaining suitable material for abrasive use requires the selection of a proper area.

Tripoli is mined by open pit quarrying methods. The tripoli lies in horizontal beds covered by a layer of top soil, decomposed tripoli, and other sedimentary soil. This layer varies from 4 to 12 feet in thickness. After the vein of tripoli is exposed by removal of this overburden, small charges of a slow powder are so placed so that after blasting, the tripoli is broken up with a minimum of fines. The larger pieces are then broken by hand methods to chunks about 1 cubic foot. Being highly absorbent and containing from 25–50 per cent moisture, the crude is then allowed to air dry for 3 to 4 months in large open sheds. The tripoli, as mined, is quite moist, therefore thorough drying is necessary, prior to crushing and pulverizing. The various grades of colors are segregated at the sheds to enable close color classification.

The dried, crude tripoli from the drying sheds is "coarse crushed" in hammer mills and specially built jaw crushers. The product that passes a 1¼-inch screen proceeds to final artificial drying. Here again extreme care must be taken to control the drying temperature of this operation in order to insure the most efficient properties of the material. From the dryer the tripoli is processed through an advanced type of pulverizing and grinding mill equipment. An extensive screening process follows which classifies the tripoli into the following grades:

Once Ground—All through 40 mesh, 80 per cent through 200 mesh

Double Ground—All through 100 mesh, 95 per cent through 200 mesh

Air Float—All through 250 mesh

Micronized—A superfine product having a large percentage passing through 2500 mesh

These size classifications apply to both rose and cream tripoli. It is interesting to note here that the darker colored material is not as hard to screen as the lighter color. The latter under certain conditions becomes charged with static electricity thus requiring special screening techniques. The screened tripoli is then weighed and bagged for shipment.

An extensive control procedure has been incorporated in order to insure the quality of tripoli powder for use in buffing compositions. Constant checks are made on the processed material at various stages in order to comply with standard specifications. The material is checked for impurities, mainly chert; absorption factor; abrasion rating; and size classification. Along with the normal precautions taken in the manufacture of tripoli powder, very often when a new area near Seneca is selected for material development, a small run is mined and processed. This material is then checked for physical structure characteristics, and if found up to laboratory specifications, a portion is incorporated in a standard basic compound formulation. The buffing laboratory then performs actual buffing tests in order to verify the ultimate usefulness of the tripoli at this newly selected area. From this procedure it can readily be seen that a system has been evolved that will guarantee a continued supply of improved quality tripoli powder. These benefits are enjoyed by the entire finishing industry, both compound manufacturers and ultimate consumer as well.

The uses of tripoli are quite varied, although most of the production is for use as an abrasive. The pulverized material is used as an inert filler in many products such as plas-

tics, insecticides, building blocks, foundry parting, putty and as an admix for concrete. Polishing cloths and fine gem polishing are also among its uses. The main consumption is for buffing compounds, both liquid and solid types, although the liquid polish field for auto and furniture lacquer finishes is consuming large quantities of present production. Today Seneca Standard Tripoli is universally used as it is exported, 30–35 per cent of production, to all parts of the world.

The use of tripoli as an abrasive in buffing compositions for most of the softer metals takes advantage of its unique physical structure. As was previously pointed out, the high absorption allows a good balance of the ratio between the powder and various binders giving a firm product. The ratio of the abrasive to binder is very important. To impart a high lustrous finish to the basic metal, often a dry hard, hi-ratio buffing compound is desired. For a fast cutting application, a greasy or low ratio compound is used. Seneca Standard Tripoli with its versatility of incorporation with various binders can cover the entire range of operations needed to give a well cut down, lustrous finish to the metals used today in many decorative parts.

Tripoli buffing compositions in the cake or solid form are manufactured by incorporating the tripoli powder in suitable binders. These binders are made up of various fats, waxes, and oils, depending upon the desired properties of the finished compositions. One of the most commonly used materials is so-called stearic acid which is in reality a mixture of palmitic and stearic acids. This mixture is used extensively as a basis for many buffing compounds. Oleic Acid, or as it is more commonly known, Red Oil, is used to soften the stearic acid in certain applications where a softer, greasier bar is required. Triglycerides of varying titers are used for the purposes of hardening or softening compositions. Tallow, being the glyceride of mixed oleic, palmitic and stearic acids is another popular ingredient of this type. Waxes, both mineral and vegetable, are used to impart certain characteristics to the mixed fatty binders. Among these waxes are beeswax, carnuba, japan wax, petroleum micro-crystalline waxes, and paraffine wax, to mention a few. These waxes, however, should be used sparingly as they are high in unsaponifiable content and might create a cleaning problem. The selection of the proper binder should be made with the cleaning and plating cycles in mind. Recent developments have made use of additives that aid in the lifting of the residual soil after buffing when eventually immersed in the cleaning baths.

The hardness or melting point of the tripoli compositions can be varied by the proper blending of the above-mentioned materials. For example, automatic buffing operations usually require a high melting point compound in this type of buffing due to the high friction heat involved. A hard compound will avoid waste, and insure an efficient operation in this type of application. Hand buffing, on the other hand, does not require compositions with as high melting points as application to the wheel is easier with a softer bar.

The greatest progress in the last few years has been in the use and application of liquid or emulsion types of buffing compositions. The total consumption today is very definitely in favor of the liquid types. This is true because of the current trend towards more automatic production buffing operations. The application of liquid composition forms an integral part of these efficient and more economical buffing and polishing methods.

Therefore, it follows that considerable stress has been placed upon the formulation and development of liquid compositions. Naturally, the same abrasive and ratio conditions must apply in the manufacture of both bar and liquid type compounds. Originally the main problem in liquid compositions involved the formulation of a vehicle that would carry and suspend the tripoli powder, and upon application to the buffing wheel, create a so-called buffing head that would be an efficient as a properly applied bar compound. Today stable emulsions of both the oil in water and water in oil types have been developed that have proved their value, and in many cases have surpassed the efficiency of bar compounds on automatic buffing operations. It must be remembered that the main reason for the success of liquid compounds lies in its easier and more consistent application to the buffing wheel. The proper application is also a major factor in this consideration.

We know that specifications and laboratory control are very important factors in making economical and efficient compositions. Today it is also becoming more apparent that the metal finishing industry in general is beginning to recognize the importance of specifications, and therefore, a scientific approach in the manufacture of buffing compounds. Not only must the buffer be considered, but also the platers' problems must be recognized. Definite stress must be placed on the use of materials that will not only render proper buffing quality, but also be compatible with the existing cleaning cycles in order to comply with the platers' requirements. We feel that this latter factor should be a prime consideration in the final selection of a proper working, efficient and economical buffing compound.

Badaluco

Badaluco was born in 1915 and schooled in Grand Rapids, received a B.S. degree in chemical engineering from the University of Michigan in 1937 and thereafter worked for the J. C. Miller Company through the present date. In 1945 assumed the position of chief engineer of the Miller Co. in charge of the plating phase of the business, became vice-president in charge of research and development in 1951 and executive vice-president in 1953. J. C. Miller Co. was acquired by Hanson-Van Winkle-Munning Co. June 1, 1954. Badaluco is now employed by H-VW-M in the capacity of manager of buffing compound sales on a national basis.

He is a member and past president of the Grand Rapids Branch, AES and also a member of the ASM and ASTM.

PHOSPHATE COATING OF METAL SURFACES FOR INDUSTRIAL USE

By W. R. Cavanagh and R. C. Gibson

INTRODUCTION

The earliest record showing the application of a phosphate coating to a steel article appeared in 1869. In that year, G. Ross, a Captain in Queen Victoria's Royal Artillery, is reported to have treated his sword with glacial phosphoric acid, producing a coating on the steel and protecting it from the injurious action of water, damp air and perspiration.[1]

The commercial use of phosphate coatings began about 1908 when Thomas Coslett found that he could coat iron and steel articles[2] in a hot solution of dilute phosphoric acid which was saturated with iron. When the iron and steel articles were immersed in the phosphoric acid, the acid reacted with the metal releasing hydrogen gas until the surface was completely coated. The time required to coat an article with Coslett's process normally was 2 to 2½ hours, and this time was longer if the bath was not saturated with iron when the metal was immersed.

In an effort to avoid the continual loss of iron in the Coslett bath, due to oxidation of the soluble ferrous dihydrogen phosphate to the insoluble ferric phosphate, Richards[3] proposed the use of manganese dioxide in the bath in place of a portion of the iron. While the Richards bath was less subject to oxidation, it still required a close control of the "balance" or ratio between the free phosphoric acid and the phosphate combined with manganese or iron.

The difficulty of keeping the proper ratio between the free and combined phosphoric acid was solved by Green and Willard[4] who used manganese dihydrogen phosphate crystals to build up and replenish the bath. These crystals slowly decompose in water solution to liberate phosphoric acid and provide a constantly balanced bath. Such a bath was easy to control, however it still required about one hour to produce a phosphate coating and thus was limited to batch type operation.

The phosphate coatings described thus far have all been heavy (1000 to 2000 mg/sq ft of surface area) and were used mainly in conjunction with oils for corrosion protection. Some use had been made of these coatings as a base for paint, as it had been found that they increased the adhesion and durability of the paint films. However, the long processing times prevented the use of these treatments as a base for paint in manufacturing plants.

The time element was overcome, to a great extent, in 1929 when Tanner and Darsey[5] added a small amount of copper to the processing bath. The addition of copper reduced the processing time from one hour to ten minutes. (This combination was the beginning of the family of chemicals known today as Bonderite chemicals which have become widely used in industry.) With this reduction in processing time, it became possible to conveyorize phosphate installations to fit them into modern production practices.

The reception of the copper accelerated bath emphasized the advantages to be obtained by reducing the processing time and resulted in a rapid series of steps to accomplish this result. In 1931, a bath containing an oxidizing agent[6] was marketed which reduced the processing time from 10 to 5 minutes. The role of the oxidizing agent apparently is to oxidize the released hydrogen to water and thus prevent the formation of a film of hydrogen gas between the work and the solution. The next step further reduced the processing time to 2 minutes by increasing the concentration of the coating chemical in proportion to the phosphate content of the bath.[6]

Until about 1934, the use of phosphating processes was limited to immersion application. Many industries adapted these treatments to conveyorized systems; however, the conveyors were difficult to design due to the vertical changes necessary to lower the work into the solutions and raise it out again. In 1934 the introduction of a process in which the processing solution was sprayed onto the parts proved to be a revolutionary advancement in the phosphate coating field. By the use of the spray method, the operating temperatures were reduced and the concentration of the chemicals in the processing baths was also reduced. In addition, the need for vertical changes in the conveyors was eliminated as the solution could now be sprayed on the work as it hung on the conveyor. Modifications of the spray treatments have made possible the coating of sheet and strip steel in from 3 to 10 minutes.

During the 1940's the so-called "iron-phosphate" coatings were introduced. These coatings are much thinner than those previously discussed (25–80 mg/sq ft of surface), and the crystals are so small that the coatings are frequently referred to as amphorous coatings. The coatings consist of a mixture of iron oxide and iron phosphate as will be discussed later.

FACTORS INVOLVED IN PHOSPHATE COATING OF STEEL

There is no universally accepted theory as to how the phosphate coating is formed and no attempt will be made here to develop such a theory. Instead, we propose to point out some of the possible reactions and show how changes which would affect these reactions also affect the coating formation. To begin with, let us take a look at what happens in a solution of phosphoric acid. Phosphoric acid is a tribasic acid and breaks down in three steps as is shown in Equations A, B, and C.

If we were to neutralize a solution of phosphoric acid with sodium hydroxide to the bromcresol green endpoint (*p*H 4.5), we would find that the caustic had reacted with all of the

H^+ released in Equation A. Thus, we would have neutralized any "free (phosphoric) acid" present and hence this is frequently referred to as the free acid titration.

When we neutralize the original solution to the thymolphthalein endpoint (*p*H 9.2), we will have neutralized all of the H^+ released in Equations A and B. This commonly called the "total acid."

We could continue to neutralize the H^+ released in Equation C, however there is no indicator available to show the endpoint.

From the above, it is evident that if we had a solution of pure phosphoric acid and titrated it to the correct indicator endpoints, the ratio of total acid to free acid should be exactly 2. When this ratio is greater than 2, it indicates that phosphate ($H_2PO_4^-$) is present other than as phosphoric acid (H_3PO_4). If the ratio is less than 2, it indicates that a mineral acid other than phosphoric acid is present.

When phosphoric acid is used as a pickle, iron and steel with or without rust or scale is immersed in or brushed or sprayed with the acid. If rust or scale is present, the reactions illustrated in the Equations D and E take place with atomic hydrogen forming hydrogen gas, as shown in Equation F. When phosphoric acid is used in a Coslett type bath, the reactions shown in Equations E and F also take place. The differences between the two baths (a phosphoric acid pickle and a Coslett bath) depends not on what is in the bath but upon the relative amounts of each. Both free phosphoric acid and ferrous dihydrogen phosphate are present in both cases but in different proportions.

When the ferrous dihydrogen phosphate is dissolved in water, the reaction shown in Equation G takes place in which the insoluble $FeHPO_4$ which we want in the coating is formed. Thus, if we combine Equations E, F, and G we get Equation H. Here it becomes evident that if we have an excess of phosphoric acid, we speed the solution of iron and delay its decomposition into secondary ferrous phosphate and we have a typical phosphoric acid pickle, as shown in Equation E. On the other hand, if there was not enough phosphoric acid present, the reaction would proceed to the right and $FeHPO_4$ would be precipitated in the bath as sludge rather than form as coating until sufficient phosphoric acid was liberated to stabilize the bath. Thus, a stable or balanced bath should contain only sufficient phosphoric acid to keep the ferrous dihydrogen phosphate in solution. As a result, when a steel article is immersed in a boiling, balanced solution, such as the Coslett bath, some of the steel dissolves thus destroying the balance at the metal surface by reducing the amount of phosphoric acid, causing the formation at the metal surface of an equivalent amount of secondary ferrous phosphate, much of which is firmly anchored to the metal surface as the phosphate coating. (This is a simplified version of a complex reaction which is better explained in terms of the electrochemical theory of chemical attack.)

Above we have illustrated a bath which can serve as a pickle or as a coating bath, depending upon the ratio of the ingredients in the bath. When acting as a pickle, it is capable of producing coating weights of only 8 to 20 mg/sq ft, yet when acting as a coating bath it is capable of producing coating weights of 1500 to 2000 mg/sq ft.

Before leaving the discussion of the Coslett type bath, which produces a true iron phosphate coating, let us take a look at the so-called "iron-phosphate" coatings, which are a development of the 1940's. Due to the name "iron phosphate" they are occasionally confused with Coslett type coatings despite the wide differences in the coatings produced. The Coslett bath produces a coating weight of 1500 to 2000 mg/sq ft of surface consisting of secondary and tertiary iron phosphates. On the other hand, the "iron-phosphate" coatings usually have a coating weight of 25 to 80 mg/sq ft and consist of a mixture of iron oxide and iron phosphate. The foregoing is said to explain why the writers have chosen to call these coatings iron-oxide-phosphate coatings in an effort to avoid this confusion.

These coatings (the iron-oxide-phosphate type) are generally produced from hot dilute solutions of either sodium or ammonium dihydrogen phosphate at a *p*H of 5–6 (in contrast to *p*H values of 2–3 in the baths previously discussed), and are normally sprayed on the work to be coated. The coating mechanism is not well understood but can be illustrated by Equation I in which b is generally greater than a. Many of these baths contain wetting agents or detergents and are capable of removing soil as well as coating the work.

The phosphate coating baths described thus far have been relatively simple baths, in that they contain no accelerators or oxidizing agents. Most of the phosphate coating baths used today are far more complex, in that they contain oxidizing agents and/or accelerators in addition to phosphoric acid and one or more of the metal phosphates. In discussing the role of accelerators or oxidizing agents in the coating formation, it is best to use the more recent concept of the method of coating formation based on the electrochemical theory of chemical attack.

The electrochemical theory of chemical attack states that steel enters into solution at the anodic areas as shown in Equation J and that the reactions shown in Equations K and L occur at the cathode areas. Either reaction at the cathode (K or L) results in a reduction in the acidity in the solution next to the cathodic area. This reduction in the acidity causes the reactions shown in Equations M and N to proceed to the right and to precipitate the secondary and tertiary phosphate on the cathodic areas as coating.

The role of the oxidizing agent is to speed up the reaction illustrated in Equation L thus reducing the hydrogen gassing and increasing the rate at which the metal is going into solution (J).

Metals such as copper which are cathodic to the dissolving iron increase the rate of solution of iron by depositing on the iron and forming local cells with it. Thus, a large number of centers for crystal growth are produced which result in rapid formation of the phosphate coating.

EQUATIONS

A $H_3PO_4 \rightleftharpoons H^+ + H_2PO_4^-$

B $H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{-2}$

C $HPO_4^{-2} \rightleftharpoons H^+ + PO_4^{-3}$

D $FeO + 2H_3PO_4 \rightarrow Fe(H_2PO_4)_2 + H_2O$

E $Fe + 2H_3PO_4 \rightarrow Fe(H_2PO_4)_2 + 2H^+$

F $2H^+ \rightarrow H_2$

G $Fe(H_2PO_4)_2 \rightleftharpoons Fe\,HPO_4 + H_3PO_4$

H $Fe + 2H_3PO_4 \rightarrow Fe(H_2PO_4)_2 + H_2 \rightleftharpoons Fe\,HPO_4 + H_3PO_4$

I $2a\,NaH_2PO_4 + (a\&b)Fe + bO_2 \rightarrow aFe\,HPO_4 + bFeO + bH_2O + aNa_2HPO_4$

J $Fe^0 \rightleftharpoons Fe^{+2} + 2e$

K $2H^+ + 2e \rightleftharpoons H_2$

L $O + H_2O + 2e \rightleftharpoons 2OH^-$

M $M(H_2PO_4)_2 \rightleftharpoons M\,HPO_4 + H_3PO_4$

N $3M\,HPO_4 \rightleftharpoons M_3(PO_4)_2 + H_3PO_4$

FACTORS WHICH INFLUENCE CRYSTAL GROWTH

The preceding description of some of the possible reactions involved in the coating mechanisms are oversimplified and do not represent all of the means of influencing the coatings chemically. Much can be done by varying the type of accelerator used and the proportions of the various ingredients in the bath to change the crystal structure in the coating as well as the coating weight. With a fixed bath composition, considerable variation can be made in the coating by changing the processing time and the temperature.

Perhaps the most widely known (and least understood) influence is that of surface preparation. It is generally accepted that the surface to be treated should be free of grease and oil, but the manner of removing the grease and oil can make the difference between a coating consisting of large crystals with uncoated areas between the crystals and a dense growth of small crystals located very close together. The use of pickles, electrolytic cleaners or cleaners containing appreciable amounts of free caustic will result in coatings consisting mainly of large coarse crystals commonly referred to as "sparkle." The use of alkali cleaners containing no free caustic usually results in coatings consisting of moderate sized crystals and no "sparkle." It was early discovered that extremely smooth coatings could be obtained by wiping the part before processing, either with a wet or dry rag, solvent wet cloth or even with the bare hand. This phenomenon was commonly called the "wipe effect." The "wipe effect" has been attributed by Streicher[10] to the removal of a film which is an inhibitor in the phosphating process and which is deposited by the cleaning operation. According to Streicher, this film is not removed in normal rinsing operations but can be removed mechanically.

Many attempts have been made to reproduce mechanically or chemically the effect obtained by wiping. A number of patents have been issued covering some of the methods proposed. Tanner[11] proposed the use of rubber covered rolls, to pass sheet steel between during the processing, in order to produce a fine dense crystal pattern in the coating. Romig[12] proposed the use of oxalic acid as a pretreatment to produce such a crystal pattern. Both of these solutions produced the desired results; however, the first was limited to flat sheets and coils and the second gave variable results as the iron dissolved in the oxalic acid. A more satisfactory solution, particularly for zinc surfaces was proposed in 1943 by Jernstedt[13,14] using disodiumphosphate containing a small amount of titanium as a pretreatment.

The solutions introduced by Jernstedt were extremely effective on zinc surfaces but less so on steel. It was found that these materials were more effective on steel when combined with alkaline cleaners. Unfortunately, under conditions of high temperature and high alkalinity the activating agent in the Jernstedt solution is not stable. In 1949 a cleaning combination was developed in which the activating agent was stable at elevated temperatures. By using this cleaner, it has been possible to produce extremely fine dense coatings in the normal steps of cleaning, rinsing, treating, rinsing and acidified rinsing, thus avoiding hand cleaning, extra tanks or mechanical scrubbing.

To illustrate the effect of various factors on crystal growth in the coating, the photographs in Figs. 1 through 13 are reproduced.

Figures 2 through 8 show the crystal structure of zinc-iron phosphate coatings. The coatings were produced in the same solution at the same time on panels with various types of surface preparation. The use of a pickle or a caustic treatment resulted in large crystals with uncoated areas between the crystals. The use of Parco* Cleaner 352, a mild alkali, resulted in much smaller crystals with fewer bare areas. The use of oxalic acid or Parco Cleaner 341, a cleaner containing Jernstedt salts, resulted in much smaller crystals with the hand-wiped panel having the smallest crystals.

Figures 10 through 13 show the crystal structure produced by a zinc-phosphate solution on a zinc plated surface. The mild alkali in this case produced the largest crystals. The use of Parco Cleaner 341 resulted in smaller but still large crystals. Wiping the panel resulted in even smaller crystals but Parcolene Z (the Jernstedt salts) produced still smaller crystals.

Figures 1 and 9 show the untreated steel and zinc plated steel surfaces.

PHOSPHATE COATINGS FOR CORROSION PROTECTION

Phosphate coatings are seldom used alone for corrosion protection but rather are normally coated with a supplementary film of oil or wax when used for this purpose. The crystalline phosphate coating provides considerable protection by itself and also acts as a blotter to hold the supplementary film on the base metal. The combination of the phosphate coating and the supplementary film appears to give a synergistic effect in that the protection afforded by the combination is greater than the sum of the protection given by the two separately.

Three types of coatings have been used to provide corrosion protection. The original coatings consisted of iron-phosphate crystals and were produced from a solution of ferrous dihydrogen phosphate and phosphoric acid, as shown in Equation H, with the reaction proceeding all the way to the right. The zinc-phosphate coating actually consists of a mixture of zinc phosphate and iron phosphate and is produced from an accelerated zinc dihydrogen phosphate bath containing ferrous dihydrogen phosphate and phosphoric acid. The manganese phosphate coating consists of a mixture of manganese phosphate and iron phosphate and is produced from a bath containing manganese and iron phosphates and phosphoric acid. The iron phosphate coatings are very seldom, if ever, used today due to the difficulty of controlling the bath and the long processing time (2 to 2½ hours). The zinc phosphate coatings are the coatings most widely used for this purpose and are produced in a much shorter time (30 to 45 minutes) from an easily controlled bath. The manganese phosphate coatings are also produced from an easily controlled bath and the processing time is intermediate between the other two (45 to 90 minutes). The fact that the chemical used in the manganese phosphate bath can be supplied in granular form is sometimes an advantage.

All of these coatings are produced by immersing the clean articles in the hot processing solution for the required length of time. The weight of the coatings produced depends upon the manner in which the articles are cleaned, the composition of the processing bath, and the analysis and previous history of the steel or iron. Most coatings, however, which are used for corrosion protection have weights between 800 and 2500 mg/sq ft of surface. A photomicrograph of a typical coating used for corrosion protection is shown in Fig. 11.

The protection afforded by these coatings can be illustrated by referring to the requirements in Military Specifications and also to actual tests run out of doors. The Military Specification[15] covering these products require that

FIG. 1—UNTREATED STEEL 100X

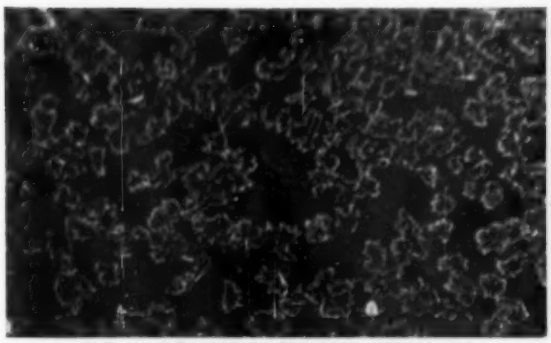


FIG. 2—BONDERITE TREATED STEEL 23X
Surface preparation—Sulfuric Acid pickle

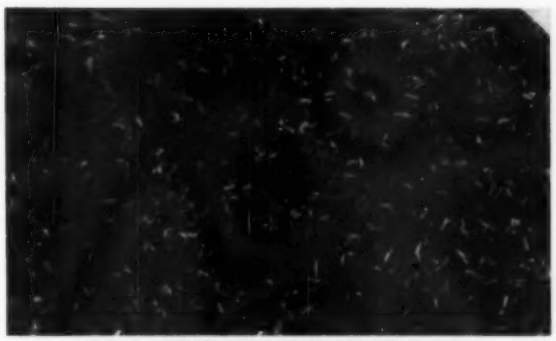


FIG. 3—BONDERITE TREATED STEEL 23X
Surface preparation—hot 3% NaOH

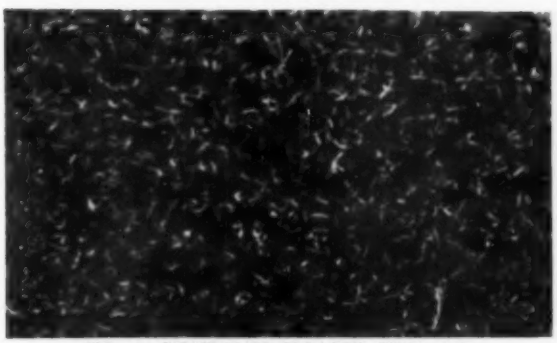


FIG. 4—BONDERITE TREATED STEEL 23X
Surface preparation—Parco Cleaner 359

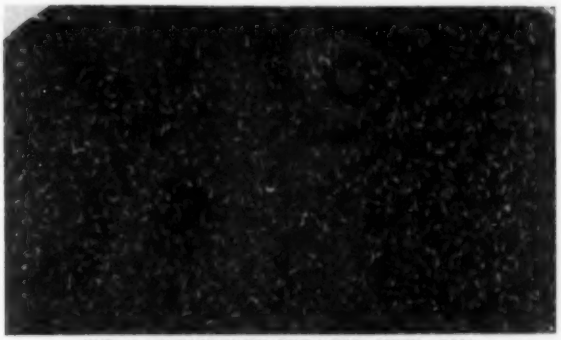


FIG. 5—BONDERITE TREATED STEEL 23X
Surface preparation—hot 3% NaOH followed by Oxalic Acid

FIG. 6—BONDERITE TREATED STEEL 23X
Surface preparation—hot 3% NaOH followed by Parcolene Z

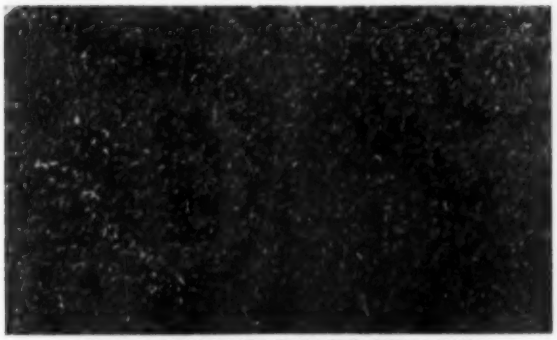


FIG. 7—BONDERITE TREATED STEEL 23X
Surface preparation—Parco Cleaner 341

FIG. 8—BONDERITE TREATED STEEL
Surface preparation—wiped

FIG. 9—UNTREATED ZINC PLATE 23X

FIG. 10—BONDERITE TREATED ZINC PLATE 23X
Surface preparation—Parco Cleaner 352

FIG. 11—BONDERITE TREATED ZINC PLATE 23X
Surface preparation—wiped

FIG. 12—BONDERITE TREATED ZINC PLATE 23X
Surface preparation—Parco Cleaner 341

FIG. 13—BONDERITE TREATED ZINC PLATE 23X
Surface preparation—Parcolene Z

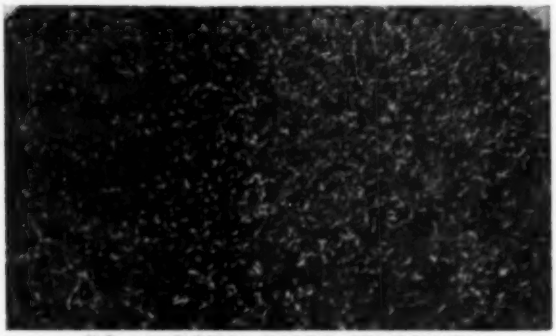


FIG. 14—TYPICAL PARCO COMPOUND COATING 23X

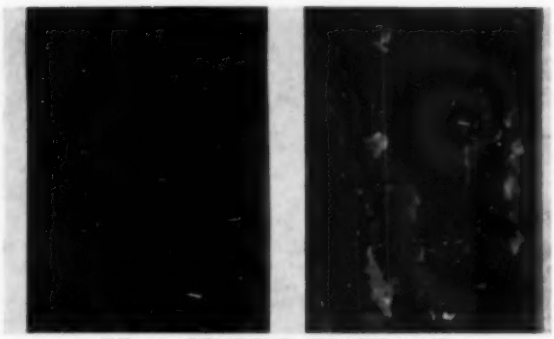


FIG. 15—BONDERITE TREATED AND UNTREATED PANELS
After 6 years' exposure to a rural atmosphere finished with 2 coats Black Enamel System

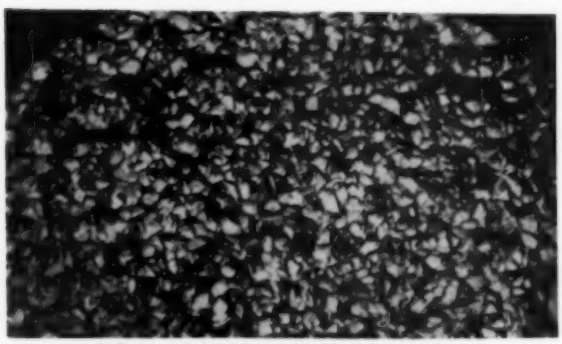


FIG. 16—PARCO LUBRITE COATING—ENLARGED 100X

when oiled they shall withstand a 48-hour salt spray test with no sign of rust. The protection afforded by both manganese phosphate and zinc phosphate type coatings when exposed to a rural atmosphere is shown in Table I.

TABLE I. LOSS IN WEIGHT DUE TO CORROSION DURING 16 MONTHS EXPOSURE TO RURAL ATMOSPHERE EXPRESSED IN MGS PER 100 SQ CM OF SURFACE

Type of Coating	Coating weight in mg/sq ft	Loss in Weight	
		Unoiled	Oiled with Linseed Oil
Manganese Phosphate	2940	10.1	0.02
Zinc Phosphate (for corrosion protection)	1250	11.5	0.9
Zinc Phosphate (for paint base)	364	15.2	2.8
Untreated Steel	—	21.8	10.2

PHOSPHATE COATINGS AS A BASE FOR PAINT

Although the early heavy coatings were used primarily to protect iron and steel from corrosion, it was soon found that when paint was applied over these coatings the life of the paint was greatly prolonged. For practical purposes, the long processing times (1–2½ hours) restricted the use of these coatings to special circumstances. In spite of this and the close chemical control required on these baths, the original iron phosphate coatings are reported by Hudson[3] to be in use in England today and have recently been recommended for use on structural steel[4] in this country. They are specified on some oil storage tanks although in such cases the processing times may be reduced.

The bulk of the work which is given a phosphate coating today is subsequently painted and most of these coatings are what might be called the medium weight coatings. The range of coating weights, in this class, is from 150 to 800 mg/sq ft of surface. No attempt will be made to cover the methods of application except to say that the processing solutions can be varied so as to be applied by spray, immersion, brush or swab, at temperatures from 70° to 210° F and at processing times from 10 seconds up to 10 minutes. The solutions used are almost exclusively zinc phosphate solutions with various addition agents by which it is possible to cast not only iron and steel but also zinc and aluminum.

The fact that phosphate coatings have contributed substantially to the durability of subsequent paint films is widely accepted.[16,17] The phosphate coatings serve to increase the mechanical adhesion of the paint film by providing the pores and cavities in the coating for the paint to soak into before drying, and also by providing an increased surface area on which the intermolecular forces contributing to adhesion can act.[18] In addition to this increased adhesion of the paint film, the ability of the phosphate coating to prevent or delay the spread of corrosion when the finish is scratched through to the base metal confines the attack to the immediate area of the scratch. As a result, there is very little, if any, peeling of the paint away from the damaged area.

The ability of the phosphate coating to prevent underfilm corrosion is well illustrated when used to prepare zinc surfaces for painting. The phosphate coating on zinc appears to prevent completely the reaction between the oils in the paint and the zinc surface which so often has resulted in complete loss of adhesion of paint films on zinc. In Fig. 15, two panels are shown which have been exposed to a rural atmosphere for 6½ years. Both panels were cleaned by hand scrubbing and one was given a phosphate coating, after which both panels were finished with two coats of black enamel. Note that the paint is completely gone from the untreated panel while on the treated panel the film is still intact.

We have discussed the heavy and the medium weight coatings which are used as a base for paint. There are also two types of coatings with lower weights which are used for this purpose. The first are the zinc phosphate (or zinc-iron phosphate) coatings, having coating weights of 60 to 120 mg/sq ft of surface. These treatments are normally applied in the steel mill with processing times of 2 to 15 seconds. They are characterized by a fine dense crystal structure and can be successfully formed either before or after painting without destroying the coating or the paint film.

The second group of light weight coatings are the iron oxide-phosphate coatings which have coating weights of 25 to 90 mg/sq ft of surface. These coatings are normally applied by spray application, although immersion application is used to some extent. The processing solution consists of a dilute solution of an alkali phosphate with other additives such as detergents and oxidizing agents. For improved quality coatings an appropriate oxidizing agent is used. The iron oxide phosphate coatings have such a fine crystalline structure that they have been described as being amphorous and as a result the coatings are very thin and hard. They fill the gap between ordinary cleaning of the metal and the obtaining of a substantial phosphate coating.

PHOSPHATE COATINGS USED AS AN AID IN THE COLD FORMING OF METALS

The uses of the phosphate coatings have expanded considerably since the days of the early coatings which were used primarily for corrosion resistance. It has been pointed out that the lowering of the processing time increased the use of the coatings as a base for paint. In addition, phosphate coatings are now used as an aid in the cold forming and drawing of metals, for increasing the wear resistance of moving parts, to prevent Babbitt metal from sticking where it is not wanted, to prevent the seizing of oil sucker rods, and for many other purposes. The fact that the coatings can now be applied to zinc and aluminum, as well as iron and steel, has also increased the opportunities to use these coatings.

The fastest growing field for phosphate coatings is in their use as an aid in the cold forming and drawing of metals. In this application, advantage is taken of the ability of the coatings to both act as a lubricant and as a carrier for oil and soap films used as lubricants.

All types of phosphate coatings have been used, to some extent, in this field. The all iron and the manganese phosphate coatings, however, are very seldom used and the iron oxide-phosphate coatings are used only where the metal deformation is small. The zinc phosphate coatings are by

far the most widely used coatings in this application, due partially to their ability to react with some types of lubricants.

The crystals comprising the coatings are deformed or crushed under the heavy pressures used in the forming and drawing operations. Some portions of the coatings remain firmly attached to the base metal despite the severe deformation of the metal and much of the remainder of the coating, while loosened from the base metal, remains in the immediate vicinity to serve as a lubricant and both portions of the coatings serve to prevent metal to metal contact during the operation. In actual use, the phosphate coated article is almost universally impregnated with a soap solution or other lubricant which is absorbed by or reacts with the coating before the part is formed or drawn. When a lubricant is used which reacts with the phosphate coating, the result is a system which is stable under extreme pressures. By the use of such lubricant systems, two to four successive draws have been made without intervening anneals or relubrication.

The use of the phosphate coatings, in these operations, have resulted in greatly increased tool life, fewer rejects due to scratches in the formed articles, greater reductions and deeper draws, and also the ability to make successive draws on an article without relubricating. In short, the use of the phosphate coatings in cold forming and drawing operations have resulted in obtaining greater production speeds and also in making draws which were impossible without the phosphate coating.

THE USE OF PHOSPHATE COATINGS TO REDUCE WEAR

The use of phosphate coatings to reduce wear on bearing parts and to permit the rapid break in of new parts is a well established use. It is commonly agreed that wear will be greatly reduced if a continuous film of oil can be maintained between the bearing surfaces. To maintain such a film between smooth and nonabsorbent surfaces, under pressure, is a problem which has challenged all manufacturers of lubricants for many years. All phosphate coatings will maintain such an oil film until subjected to pressure and abrasion under which conditions most coatings rapidly break down.

The coatings produced on properly cleaned surfaces by a manganese dihydrogen phosphate solution, containing a small amount of iron phosphate and an oxidizing agent, have been found to provide protection even under pressure and after abrasion. Parts treated by immersing them in the hot (200–210° F) phosphating solution for 10 to 15 minutes will have produced on them a heavy coating consisting of manganese and iron phosphate crystals. A photomicrograph of such a coating is shown in Fig. 16. The coatings thus produced hold a uniform film of oil on the bearing surface as long as the coatings remain. After these coatings have been worn off, the minute pits uniformly etched in the bearing surface continue to serve as reservoirs of oil to keep the bearing lubricated.

The ability of these coatings to allow rapid break-in of new parts and then reduce subsequent wear has resulted in their wide use on pistons, cam-shafts, tappets, and gears.

PRIMER PRETREATMENT COATING (WASH PRIMER)

The wash primer is designed to bring the advantages of surface treatment to structural steel and custom fabricated articles too large to process by conventional methods.

Wash primers form both inorganic and organic films on the surface of the metal. Conventional formulations contain an organic solvent, a binding resin, a metal etchant and a corrosion preventive pigment. A typical WP-1 material consists of a mixture of isopropanol and methyl isobutyl ketone as solvent, a vinyl butyral resin, phosphoric acid as the metal etchant and basic zinc chromate as the corrosion inhibitive pigment. This wash primer is supplied in a two-compartment container, consisting of resin and acid materials which are mixed just prior to use. The mixture must be used within a few hours time due to its instability.

Recently, one-coat pigmented metal conditioners, such as Parco Prime 47, have been developed. This material comes in one package, ready for use without the usual combining of liquids. It is stable in the container and may be thinned to desired consistency prior to application by brush or spray. Metal surfaces must be free from grease, rust, mill scale, and other foreign matter before application of the metal conditioner. Top coats of paint may be applied as soon as the film is dry to the touch (a few minutes).

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Dr. Gibson received his B.S. degree from Adrian College, Adrian, Michigan in 1925 and a Ph.D. degree from the University of Michigan in 1930.

He was Assistant Professor of Chemistry at Ohio Northern University, Ada, Ohio from 1930 to 1934, at which time he transferred to the Parker Rust Proof Company of Detroit, Michigan where he has been from 1934 to the present time. At the Parker Rust Proof Company he has served as Research Chemist, Assistant Director of Research, Director of Research, Technical Director and at the present time is serving as Assistant Vice-President.

His work has been mostly devoted to the field of metal finishing, involving metal surface preparation and coating prior to paint application, for corrosion prevention, for wear resistance and as an aid in cold forming and extrusion of metals.

W. R. CAVANAGH

Cavanagh

Cavanagh received his B.S. degree from Adrian College, Adrian, Michigan in 1937.

Since that time he has been employed by the Parker Rust Proof Company, Detroit, Michigan as Research Chemist, Development Chemist and at the present time is Manager of the Development Department.

His field has been the surface preparation of metals particularly in the use of phosphate and related coatings in respect to their application and use.

A NONOXIDIZING HEAT TEST FOR PLATING ADHESION

I. WM. MARCOVITCH

INTRODUCTION

The question of practical methods to determine the adhesion of electroplated coatings to the base metal has always been the concern of the plater. Various tests for adhesion have been given complete treatment in the literature.[1,2,3] In the main, they are performed either on especially prepared specimens or they depend on mechanical distortion of the plated surface in the attempt to produce bond failure. The latter method destroys the part which may often be rather costly; the former does not test the plating on the part itself, which, in the final analysis, is the desired end.

A nondestructive method for testing adhesion is the application of heat to the part or surface. This is particularly suitable when the plating must withstand an operation involving heat, such as soldering. The temperature used in the test should be not less than that required by the heating operation. In the case of parts to be soldered, the test temperature should be over 400° F.

Temperatures of this order applied by baking the parts in air, promote rapid oxidation of the plated surface. The reprocessing of the resulting oxidized parts to their original appearance may be costly and difficult, if not impossible. This may, of necessity, limit the performance of the baking test to too few specimens to be a true sample of the lot under test.

Heating in a controlled, nonoxidizing atmosphere oven or furnace will obviate the dangers of oxidation. However, this type of equipment is expensive and is usually not readily available to the plating department.

DESCRIPTION OF METHOD

A means of heating that does not oxidize the surface has been found in the use of hot fat or oil normally used to flow tin or tin-lead alloy coatings. The author's experience has been with a proprietary fat*; conceivably, other materials, such as palm oil, will also serve for this purpose.

The fat or oil is heated between 475° and 500° F. The parts are: (1) Immersed in the heated oil for two minutes; (2) Quenched in kerosene; (3) Degreased to remove the kerosene and traces of oil in a trichlorethylene or perchlorethylene degreaser.

No oxidation of the plated surface takes place and the parts retain their original color and lustre.

The temperature given (475°-500° F) is above the melting point of several frequently plated metals, such as tin (450° F), tin-lead alloys containing more than 30 per cent tin, and indium (311° F). To test these coatings by the method described, temperatures lower than the melting points of the metals would have to be used. This also would apply to parts on which tin-lead solders had been used prior to plating and heat testing.

The number of parts that may be tested at one time is limited only by the size of the oil bath and baskets used to hold the parts. Because of this bulk method of handling, 100 per cent testing of a lot of plated parts is an economically feasible procedure.

RESULTS

The following coatings have been tested by this method in production quantities: bright nickel and chromium on brass; copper and gold on aluminum.

This heating method produced blistered and peeled plating parts with defective plating adhesion that prior to the test gave no visual indication of this condition.

Where no failure was apparent after the heat test, severe deformation of the part or the heat of subsequent soldering operations produced no failure of the plating bond.

PRODUCTION TESTING

In testing production lots of plated parts, it is suggested first to heat test a representative sample. If this shows no failure, it may be safe to assume the lot is satisfactory and passed without further testing.

Should any failures be evident in the sample, the entire lot should be subjected to the test. The defective parts will be readily apparent and can be separated from the acceptable parts and reworked.

EQUIPMENT

The size of the oil container may vary widely, being governed only by the size, shape and number of parts to be tested. It may vary from a Pyrex beaker, holding but a few hundred milliliters and heated on a laboratory hot plate, to a tank capable of handling large quantity lots, the design of which would require careful engineering preparation.

The material of a large tank may be steel, stainless steel or monel, heated by oil, gas or electricity, insulated to prevent contact burns and to reduce heat losses,

*Hydrofol Tinfat No. 25, Archer-Daniels-Midland Co.

and equipped with automatic controls to maintain optimum temperatures and prevent heating beyond the flash point.

Since a volume of fatty smoke is liberated from the heated oil, adequate ventilation to remove the smoke must be provided. The accumulation of fat particles deposited from the smoke should be removed regularly from the exhaust system.

The kerosene quenching tank should be placed adjacent to the oil tank so that it may be exhausted under the same hood and to confine the dragout drippings to the space between the tanks.

Quenching the heated parts will raise the temperature of the kerosene; to prevent it from rising above the flash point (above 100° F), some means of cooling should be provided. This may be done by placing the kerosene container in a bath of running cold water. Since kerosene is not a good conductor of heat, air bubbling gently through the kerosene will provide better circulation and quicker cooling.

A description of a well-engineered hot oil tank and fume exhaust system has been published[4] and can be recommended as a guide in designing an installation for production-size lots.

PRECAUTIONS

The parts to be tested must be *completely free* of moisture before contact is made with the heated oil. Even traces of water can generate sufficient steam quickly enough on contact with the hot oil to create the hazard of scattering hot oil out of the tank.

Very severe and penetrating burns are caused by oil at the testing temperature coming in contact with the skin. The operator should be protected with a face shield, heat-resistant gloves and should work with his sleeves rolled down.

A fire extinguisher should be placed within close proximity of the installation and should be of the carbon dioxide type. No water or water-solution type extinguishers should be used.

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I. Wm. Marcovitch

I. WM. MARCOVITCH

Majored in chemistry at Drexel Institute of Technology Evening School and was graduated in 1930. Prior to 1942 was associated with the paint industry in laboratory, manufacturing, sales and advertising capacities.

Entered the plating field in 1942, as a plating chemist and standards engineer, specializing in plating, at RCA-Victor until 1946; superintendent of a plating job shop for a year. Since March 1948, plant chemist and foreman of plating and polishing at the Sellersville, Pa., plant of American Machine & Metals, United States Gauge Division.

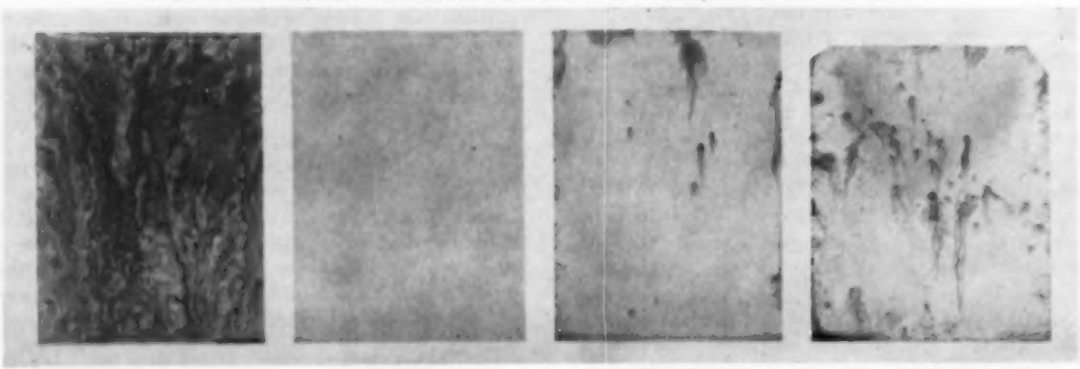
Member of AES since 1943; secretary of the Philadelphia branch since 1948 and delegate since 1949.

CRACK-FREE CROMIUM

One of the great problems plaguing the plating industry throughout its history has been that ordinary chromium at deposit thicknesses of more than 0.0001 inch shows structural cracks which permit corrosive agents to reach the underlying metal. At decorative thicknesses, chromium deposits contain pores varying in number with plating conditions. As the deposit thickness increases, the number of pores decrease and a cracked structure develops and continues regardless of the increase in thickness.

In the September 1953 issue of PLATING Magazine, R. Dow and J. E. Stareck reported on a bath depositing crack-free chromium. United Chromium, Inc., has now announced a commercially practicable process using this bath. This company claims that the new plate can be deposited free of any structural imperfection and can therefore be plated directly on steel without the necessity for an undercoat of nickel or copper and nickel. The crack-free chromium plating is done with a special chromic acid type bath having automatic regulation of the catalyst concentration. Standard plating equipment and procedures are used, and, according to field reports, the bath is easy to operate and maintain.

SALT SPRAY RESULTS—CHROMIUM DIRECTLY ON STEEL, THICKNESS—0.0003 IN.



Ordinary
24 Hours Exposure

Crack Free
24 Hours Exposure

Crack Free
100 Hours Exposure

Crack Free
175 Hours Exposure

The Colorimetric Determination of Lead In Effluents

EARL J. SERFASS AND RALPH M. MURACA

ABSTRACT

This monocolor method for the determination of 5–50 ppm of lead consists of an extraction of the reduced effluent with a solution of dithizone at a *p*H of 2–3 to remove interfering elements, particularly bismuth and tin. A subsequent extraction at a *p*H of 8–9 in the presence of cyanide serves to remove the lead as the dithizonate from the sample. After removing the excess dithizone by extraction at a *p*H of 11.5, the intensity of the color of the lead dithizonate is estimated by means of a colorimeter or a spectrophotometer.

The procedure can be shortened when less than 2–3 ppm of each metal is present and a table summarizes the changes which can be made for these samples.

THE DETERMINATION OF LEAD IN EFFLUENTS

The colorimetric determination of trace quantities of lead is conveniently carried out by the use of diphenylthiocarbazone (dithizone) in cyanide medium at a *p*H of 8–9. Although numerous investigators have developed schemes of analysis for lead in the presence of large quantities of a small number of other substances such as in plating baths,[1] steel,[2] or tin,[3] there has been no indication that these procedures can be used to analyze for lead in the presence of moderate quantities of a large number of elements.

The following recommended procedure is based on the fact that the elements which interfere with the extraction of lead at a *p*H of 8–9 in cyanide medium can be removed by a preliminary extraction. The relationship of the metals extracted to the *p*H of the aqueous phase has been admirably presented by Wichman[4] in a descriptive paper concerning the dithizone system and its application to the analysis of trace metals, and his provisional equilibrium curves for metal dithizonates in chloroform have served as a guide in the development of the method described below.

Since an effluent may contain a great number of impurities, the analytical procedure for lead must be shown capable of yielding the accurate value in the presence of the commonly occurring elements. The recommended procedure was developed by using a solution that contained 100 ppm of each of the following ions: Ag^{+}, Hg^{+2}, Bi^{+3}, Cu^{+2}, Cd^{+2}, As^{+3}, Sb^{+3}, Sn^{+4}, Fe^{+3}, Al^{+3}, Cr^{+3}, Ni^{+2}, Co^{+2}, Mn^{+2}, Zn^{+2}, Ca^{+2}, Sr^{+2}, Ba^{+2}, Mg^{+2}, Na^{+}, K^{+}, and NH_4^{+}. Since the oxidized forms of some elements destroy dithizone, the preliminary step of the analysis involves the reduction of the sample. The absence of cyanide ion in the test solution is of no consequence for the preliminary fuming procedure removes it. Complex cyanides are also decomposed by this treatment and so do not interfere with the analysis for lead. The concentration of 100 ppm for each ion was selected arbitrarily. It is obvious that certain of these ions namely sodium, potassium, calcium, barium, strontium, magnesium, aluminum, arsenic, antimony, and nitrogen as (NH_4^{+}) could be present in very high concentrations since these do not react with dithizone. Furthermore with the exception of the alkali metals, calcium, and magnesium, the elements present in the sample are usually below 100 ppm in effluents that are suitable for discharging into rivers and streams. The method has not been investigated on test samples in which the concentration of each of the interfering ions is greater than 100 ppm.

DESCRIPTION OF METHOD

The elements which interfere with the extraction of lead in cyanide medium at *p*H 8–9 are tin (II), thallium, and bismuth. Thallium is so rarely encountered that its interference is hardly worth consideration. On the other hand, bismuth and in particular tin occur quite frequently.

The sample is first fumed with sulfuric and nitric acids to remove organic compounds and then reduced with hydrazine to lower the oxidation state of those elements or compounds which are capable of oxidizing dithizone. The reduction assures that tin and iron will be in their lower valence states. At a *p*H of 2–3, dithizone forms complexes with copper, bismuth, tin, mercury, and silver. Thus, bismuth and the tin which remains after the fuming procedure are removed so that they can not interfere with lead extraction at *p*H 8–9. A strong solution of dithizone (0.1 per cent) in chloroform is used to extract the relatively large quantities of bismuth, tin, copper, etc.

After the removal of the interfering elements, tartrate is added to prevent the formation of hydroxides, and the solution is brought to a *p*H of 8–9 with ammonium hydroxide and sodium cyanide. By means of a dilute solution of dithizone, lead is then extracted. Since an excess of dithizone is used, the pink color of the lead dithizonate is masked by the intense green color of the excess dithizone, so the excess dithizone is removed from the carbon tetrachloride layer by

the use of an alkaline cyanide solution, leaving the orange red lead dithizonate in the organic solvent. The solution of lead dithizonate is finally diluted to a given volume and the color intensity is determined by means of colorimeter, a spectrophotometer, or by comparison with standards.

The maximum absorption of lead dithizonate in carbon tetrachloride occurs at about 520 millimicrons[1] and this absorption maximum nearly coincides with the transmission maximum of a Wratten filter number 53 or 54 (green). It is, therefore, possible to use a colorimeter to determine the concentration of lead (loc. cit.).

The use of hydrazine as the reducing agent may lead to some difficulties, since the reduction of ferric and stannic ions proceeds quite slowly. The preliminary reduction step must be carried out carefully in accordance with the procedure.

SENSITIVITY OF THE METHOD

The sensitivity of the method is defined as the smallest number of micrograms of lead which can be determined with a relative error of ±50 per cent. For the following recommended procedure this corresponds to 5 ppm or 50 micrograms of lead in the one ml portion taken for analysis taken in step 7.

LIMIT OF DETECTION OF THE METHOD

The limit of detection of the method is defined as the number of micrograms of lead which must be present in the 1 ml portion taken for analysis in step 7 so that an extinction of 0.005 for a 1 cm thickness at 520 millimicrons will be obtained in step 19. This corresponds to about 0.5 microgram of lead (0.5 ppm) for the method described below.

The limit of detection is influenced by the purity of the reagents used in the determination, and the value of 0.5 ppm was obtained experimentally with reagents that were essentially free of lead. Since dithizone separations are not perfect, that is, some lead escapes extraction, the lower limit will be influenced by the total amount of lead present. For example, if 1 microgram of lead escapes, under the conditions of extraction, and the reagents contain 1 microgram of lead, then any lead introduced by the sample will be collected by the dithizone and a color indication corresponding to the amount present in the sample will be obtained. On the other hand, if the amount of lead in the sample and the reagents does not exceed 1 microgram, no color indication for lead will be obtained. In view of this consideration it may seem advisable to omit the steps recommended for the purification of the reagents. If the reagents are found to contain very little lead, then the purification steps are not necessary. When the reagents contain large quantities of lead, the blank will be high and it will be nearly impossible, with the usual colorimeters, to ascertain the presence of small increments of lead from the sample. Another reason for the purification of the reagents is to effect removal of substances which oxidize dithizone. The oxidation of dithizone results in high blanks since the oxidation product of dithizone (diphenylthiocarbodiazone) also exhibits some absorption at 520 millimicrons.

RECOMMENDED PROCEDURE

This procedure is designed to be used for the accurate determination of lead in effluents in the range of 5 to 50 ppm.

REAGENTS REQUIRED

(1) *Hydrazine Acetate:* Hydrazine hydrate in a concentration of 60–65 per cent hydrazine can be obtained almost lead free from Matheson Coleman and Bell Incorporated, E. Rutherford, New Jersey. Mix 15 ml of this product with 50 ml of glacial acetic acid and then dilute to 100 ml with water.

(2) *Hydrochloric Acid:* Distill concentrated commercial acid in a Pyrex apparatus. The distillate will be approximately 22 per cent HCl.

(3) *Ammonium Hydroxide:* Pass ammonia gas from a cylinder into redistilled water in a Pyrex container kept cold by an ice bath. Store in plastic bottles.

(4) *Sodium Tartrate Solution:* 10 per cent w/v to purify, shake with 0.025 per cent dithizone in carbon tetrachloride until the organic solvent layer appears pure green in color. Wash away the traces of dithizone in the solution by extraction with pure chloroform until the solution is water white. Then extract twice with carbon tetrachloride.

(5) *Dithizone, 0.1 per cent w/v in Chloroform:* To remove the chief impurity, diphenylthiocarbodiazone, proceed as follows: The purification depends upon the insolubility of diphenylthiocarbodiazone in basic aqueous solutions. Dissolve 250 mg of dithizone crystals in 50 ml of $CHCl_3$; filter through a small paper and wash the filter with several small portions of chloroform. Transfer the filtrate to a separatory funnel and extract with portions of a 1:100 solution of ammonium hydroxide until the chloroform layer is nearly devoid of green color. Discard the chloroform layer and wash the combined extracts of ammonium hydroxide with four 15 ml portions of chloroform. Discard the chloroform extracts. Precipitate the dithizone by the addition of 2 ml of concentrated HCl; shake to completely neutralize the ammonia. Extract the precipitated dithizone with 25 ml portions of chloroform and finally dilute the combined chloroform extracts with pure chloroform to a volume of nearly 250 ml. The solution keeps well in the cold; it is preferably kept in the refrigerator or in cold running water. In lieu of keeping the solution cold, make up fresh as needed. The decomposition of this solution is evidenced by a gradual decrease in green color.

(6) *Dithizone, 0.025 per cent w/v in Carbon Tetrachloride:* Dissolve 125 milligrams of dithizone in 50 ml of chloroform and filter through a small filter paper. Wash the filter paper with small portions of pure chloroform and combine all filtrates. Extract the filtrates with 1:100 NH_4OH until the $CHCl_3$ layer is nearly devoid of green color. Wash the aqueous layer with pure CCl_4 to remove traces of chloroform and diphenylthiocarbodiazone. Reject the carbon tetrachloride extracts. Neutralize the ammonium hydroxide by shaking well with 2 ml of conc. HCl. Extract the precipitated dithizone with pure carbon tetrachloride. Dilute the carbon tetrachloride extracts to 500 ml with pure solvent. This solution must be kept cool at all times in a refrigerator or, less desirably, in running water.

(7) *Potassium Cyanide:* 10 per cent w/v. Dissolve 10 grams of the purest salt in 100 ml of distilled water.

(8) *Tartaric Acid Solution:* 50 per cent w/v. Dissolve 50 grams of the pure crystallized acid in 100 ml of water.

(9) *Acetic Acid:* N/10. Dilute 6 ml of pure glacial acetic acid to one liter of distilled water.

(10) *Thymol Blue Indicator:* 0.04 per cent w/v. Solution in water.

(11) *Alkaline Potassium Cyanide:* To 175 ml of pure concentrated ammonium hydroxide add 15 ml of 10 per cent KCN solution (see above) and 7.5 ml of a solution of lead free 10 per cent sodium sulfite. Dilute to 500 ml with water. To remove the lead from sodium sulfite, add 10 gm of sodium sulfite, exsicc., to 100 ml of water and extract with 0.1 per cent dithizone solution until the color of the organic layer is pure green. Remove traces of chloroform by four or five extractions with pure carbon tetrachloride.

(12) *Standard Lead Solution:* 1 ml = 100 micrograms of lead. Dissolve 100 milligrams of the purest lead metal in a mixture of 2 ml of conc. HNO_3 and 2 ml of water. Heat gently if necessary. Quantitatively dilute to 1 liter with pure water. Store in plastic bottles.

(13) *Carbon Tetrachloride:* Use only reagent quality. The commercial material often contains carbon disulfide and the recovered material may even contain phosgene or sulfur compounds. Since all of these substances react with alkali, shake 100 ml of the solvent with 50 ml of a 50 per cent solution of KOH in ethanol. Repeat this extraction several times. Now wash the CCl_4 with 25–50 ml portions of concentrated H_2SO_4 several times. The final washing with the acid should show no discoloration. Wash the CCl_4 with a dilute solution of sodium bicarbonate; wash repeatedly with water until the washings are perfectly neutral to litmus paper. Dry over night with $CaCl_2$ and distill. Instead of drying, distill about 10 per cent of the solvent and then collect the clear distillate. Do not distill the last 50–100 ml after collecting the main fraction.

(14) *Chloroform:* All chloroform, especially the reclaimed solvent must be treated as follows: Drain off all water. Wash with conc. H_2SO_4 until the solvent and the acid layers are clear and colorless. Use 50–100 ml of acid per 1000 ml of solvent. Shake the solvent with a dilute solution of sodium bicarbonate and then wash thoroughly. Add calcium oxide to dry the solvent. Separate from the CaO and add 2 per cent of its volume of pure, absolute methanol. Distill the solvent slowly while keeping a pellet of CaO in the still. Reject the first 50–100 ml and do not allow the still to go to dryness.

(15) *Water:* Distilled water sometimes is not as pure as it should be. If blanks run on the water show a considerable amount of heavy metals, redistill it using Pyrex glass stills and receivers. To test the water, add about 1 ml of KCN (10 per cent) to 1 ml of the water and shake with 1 ml of 0.025 per cent dithizone. The dithizone layer should show no pink coloration.

(16) *Sulfuric Acid:* Conc., 36 *N*, reagent grade.

(17) *Nitric Acid:* Conc., 16 *N*, reagent grade.

RECOMMENDED PROCEDURE

(1) Pipette a 20 ml sample of the effluent into a 125 ml Erlenmeyer flask. In running a blank, use 20 ml of water. If a calibration curve is to be established, add 1 ml of the standard lead solution for each 5 ppm of lead.

(2) Add 3 ml of concentrated sulfuric acid and 5 ml of concentrated nitric acid to the contents of the flask. Slowly bring the solution to boiling and continue heating until strong fumes of SO_3 are evolved. Fume for at least 5 minutes. If the liquid in the flask is discolored from organic decomposition products after fuming, cool the contents, add 5 ml more of concentrated nitric acid and again bring to fumes. Repeat, if necessary, until all organic matter has been decomposed. Do not allow the solution to go to dryness; add 2 ml of concentrated sulfuric acid, if necessary.

(3) Cool the residue in the flask. Dilute with 10 ml of water. Add 10–15 drops of phenolphthalein indicator, and nearly neutralize the solution with 1:1 ammonium hydroxide.

(4) Add 20 ml of hydrazine acetate and heat to 90–95° C. in a water bath for at least 10 minutes. Cool.

(5) Add 20 ml of 10 per cent sodium tartrate solution. Adjust the *p*H of the solution in the beaker to about 2.5 (using a *p*H meter) by adding either ammonium hydroxide or 50 per cent tartaric acid solution.

(6) Quantitatively transfer the contents of the beaker to a 100 ml volumetric flask and bring to the mark with N/10 acetic acid.

(7) Pipette exactly 5 ml of the solution in the volumetric flask into a separatory funnel. This corresponds to 1 ml of the effluent in a total volume of 5 ml.

(8) Extract the solution in the funnel with separate 3 ml portions of 0.1 per cent dithizone in chloroform until the organic layer has a pure green color. Shake well each time and carefully drain off and discard the chloroform layer.

(9) Extract the solution with two 5 ml portions of pure chloroform. This serves to remove the entrained dithizone. Reject the chloroform layers.

(10) Remove the chloroform that remains behind by extracting once with a 5 ml portion of carbon tetrachloride. Reject the carbon tetrachloride layer.

(11) Add 10 ml of 10 per cent sodium tartrate; also add 5 drops of thymol blue indicator. If necessary, add concentrated ammonium hydroxide to make the indicator turn blue.

(12) Add 10 ml of 10 per cent KCN. Adjust the *p*H to 8.5 by adding 50 per cent tartaric acid or ammonium hydroxide until the indicator turns to a green color.

(13) Extract with a 5 ml portion of 0.025 per cent dithizone in carbon tetrachloride. Shake well and carefully transfer the solvent layer to another separatory funnel. Do not allow any of the aqueous phase to run into the carbon tetrachloride extract.

(14) Successively extract the aqueous phase with 2 ml portions of 0.025 per cent dithizone solution until the green color of dithizone persists for at least two extractions. Combine all these extractions with the one from the previous step. When multiple samples are run, as with a calibration curve, be sure to use the same amount of dithizone solution for all extractions. The color of the blank increases as the number of extractions increases, owing to the diphenylthiocarbodiazone content of the dithizone.

(15) Extract the aqueous phase with one 5 ml portion of pure carbon tetrachloride and add it to the other extracts.

(16) To the combined extracts of carbon tetrachloride, add 20 ml of alkaline KCN and shake well. The green coloration of dithizone will be replaced by the pink coloration of lead dithizonate; the alkaline aqueous solution will be colored yellowish due to the formation of a salt of dithizone.

Composition of Effluent	Changes in the Recommended Procedure
Organic matter absent:	Pipette a 20 ml sample into a 125 ml flask, add 10–15 drops of phenolphthalein indicator and nearly neutralize the solution with 1:1 ammonium hydroxide. Start with step 4 of the recommended procedure.
Organic matter absent; cyanide present	Pipette a 20 ml sample of the effluent into a 150 ml. beaker, add 2 ml of 50 per cent tartaric acid and heat on a steam bath for 10–15 minutes to remove HCN. Then add 20 ml of hydrazine acetate solution and heat for 10 minutes. Cool. Start with Step 5 of the recommended procedure.
Organic matter absent; cyanides present; tin and bismuth below 2–3 ppm	Pipette 1 ml of the effluent into a separatory funnel and add 1 ml of a 10 per cent sodium sulfite solution (lead free). Place the open separatory funnel on its side on a steam bath. Heat 3–5 minutes. Cool and start with Step 12 of the recommended procedure. For a blank use 0.1 per cent NaCN solution.
Organic matter absent; tin and bismuth below 2–3 ppm solution is neutral	Pipette 1 ml of the effluent into a separatory funnel; add 4 ml of hydrazine acetate solution, and place the open separatory funnel on its side on a steam bath. Heat 3–5 minutes. Cool and start with Step 11 of the recommended procedure.
Organic matter absent; tin and bismuth below 2–3 ppm solution is neutral	*Short Control Procedure:* Pipette 1 ml of the effluent into a separatory funnel and add 2–3 ml of 50 per cent tartaric acid solution and 1 ml of hydrazine acetate solution. Place the open funnel on its side on a steam bath and heat for 5 minutes. Cool. Start with Step 11 of the recommended procedure. DO NOT USE PURIFIED REAGENTS
Organic matter present; tin and bismuth below 2–3 ppm	*Short Control Procedure:* Omit steps 8 to 10 inclusive. DO NOT USE PURIFIED REAGENTS

Concentration of Lead in the Effluent	Shortened Procedure
0.01 to 0.1 ppm	Use a 250 ml sample in step 1. Omit steps 6, 7, 8, 9, and 10.
0.1 to 1.0 ppm	Follow above procedure using a 50 ml sample.
1.0 to 5.0 ppm	Follow the recommended procedure, using half the volumes of reagents in steps 2 to 5 inclusive. In step 6 dilute to 50 ml; in step 7 use 10 ml.

(17) Drain off the carbon tetrachloride layer into a 25 or 50 ml volumetric flask. Extract the aqueous phase with two 2 ml portions of pure carbon tetrachloride. Combine all the extracts and reject the aqueous layer.

(18) Dilute the extracts in the volumetric flask to the mark by adding pure carbon tetrachloride and shake well.

(19) Filter the carbon tetrachloride solution through small, dry papers to remove suspended droplets of water. Read the color intensity of this solution using pure carbon tetrachloride as a reference liquid on a colorimeter equipped with a green Wratten filter No. 53 or 54 or with a spectrophotometer at 520 millimicrons.

(20) If necessary, convert the scale reading of the photometer to optical density. Subtract the blank reading from the sample readings. If a calibration curve is being established, plot these corrected readings versus micrograms of lead added. If a sample is being run, read the amount of lead present from the calibration curve.

VARIATIONS OF THE RECOMMENDED PROCEDURE

When the composition of the effluent is known, the recommended procedure can usually be shortened to suit particular samples.

The following table summarizes the changes that may be made in the recommended procedure when the composition of the sample is known. Unless otherwise stated, the concentration of each element must not exceed 100 ppm.

SHORT PROCEDURE FOR LEAD IN THE RANGE 0.01 TO 6 PPM

The following procedure is designed for the analysis of water samples where the concentrations of each of the heavy metals are very low (below 0.5 ppm) and the only elements that are present in appreciable concentration are the alkali metals and alkaline earths. The concentrations of tin and bismuth must be less than 1/10 the concentration of lead.

For the low concentration ranges, it is best to assume that organic matter will be present, therefore, do not omit the fuming with sulfuric acid. Do not omit blanks.

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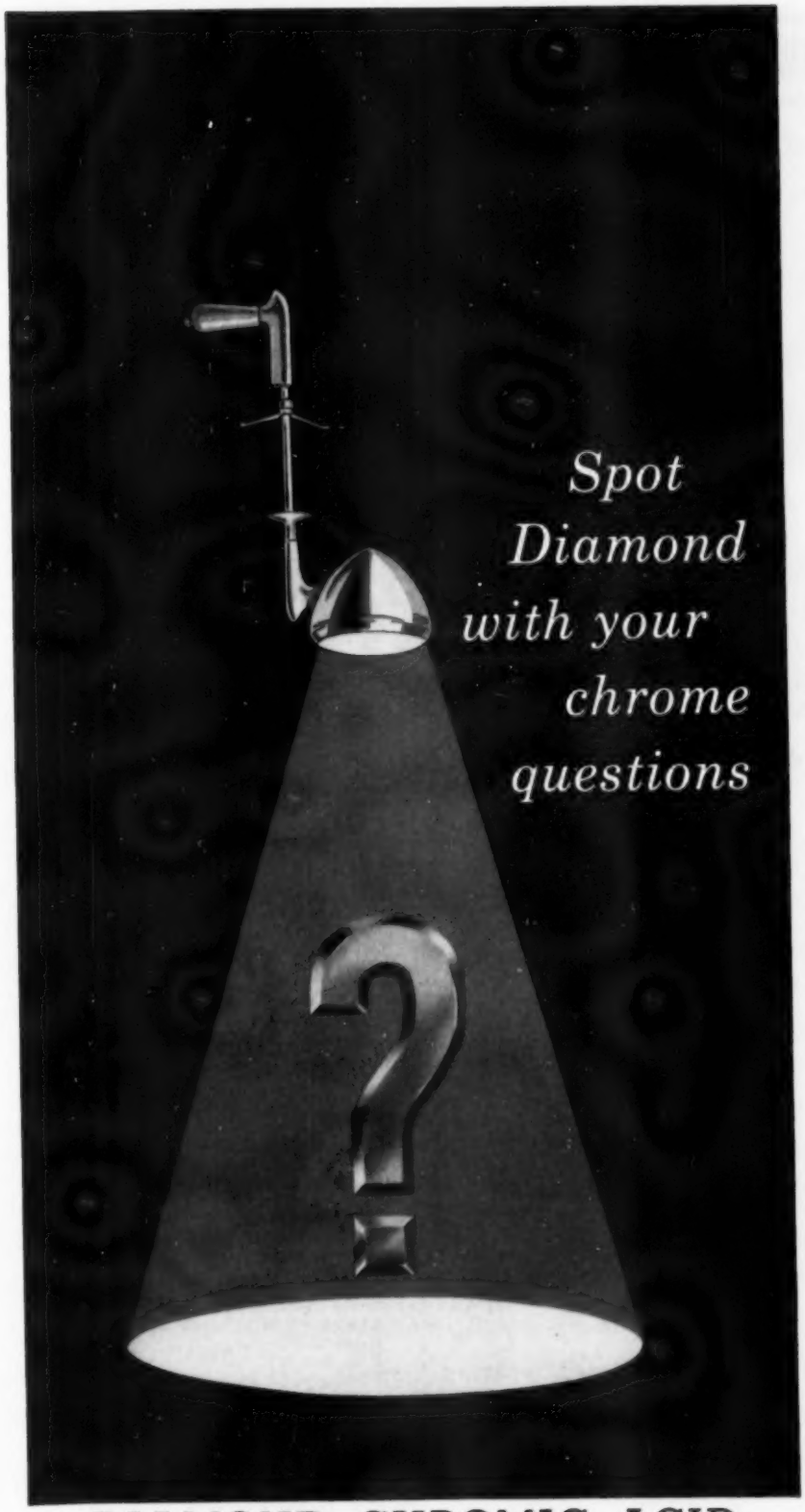
Muraca

Serfass

DR. EARL J. SERFASS, Head of the Chemistry Department at Lehigh University, is serving his second consecutive term as chairman of the AES Research Committee.



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a. *HIGH-PRODUCTION LINE DEPOSITS QUALITY CHROME PLATE ON BUMPERS*
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51. EQUIPMENT

a. *AUTOMATIC CONTACT TIMERS MITS PLATING CELL SELECTION*
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a. *TIN FLUOBORATE PLATING*
J. B. Mohler
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59. WHISKERS

a. *SINGLE CRYSTALS WITHOUT DISLOCATIONS*
H. K. Hardy
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University of Texas, P. B. 111451, 1953, 18 pp., U. S. Dept. of Commerce, Washington 25, D. C.

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ASTM BULLETIN
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A Comprehensive Review by Dr. E. B. Saubestre

Electroplating Engineering Handbook: edited by A. Kenneth Graham (Reinhold Pub. Corp.), 650 pp. $10.00 to nonmembers; $8.50 to members.

The Electroplating Engineering Handbook, edited by A. Kenneth Graham, marks a milestone in the history of electroplating. It may be said that with the appearance of the handbook, electroplating engineering has come of age, and taken its place alongside the other branches of engineering which have, for many years, had handbooks published in the respective fields. This book is much more than a review of the principles of electroplating or a compilation of bath formulae. As a result, it supplements, but does not replace such old standbys as Blum and Hogaboom, Modern Electroplating, and the Metal Finishing Guidebook. The value of this handbook is such that it should soon find itself on the bookshelf of nearly anyone who has an interest in electroplating. It is a tribute to the many contributors of this handbook that it has succeeded so well in fulfilling its stated objectives.

The book is divided into two parts. The first, entitled "General Processing Data," contains much information which has appeared elsewhere, though not as compactly. The second part, entitled "Engineering Fundamentals and Practice" is the one which really sets this book apart, for nothing comparable now exists in the literature. This part of the book is an eminently practical, down-to-earth treatment of such subjects as plating installations, floors, tanks, linings, racks, heating and cooling, bus systems, current sources, exhaust systems, barrels, filtrations, rinsing, drying and maintenance.

The handbook has two general shortcomings, however. One of them is shared by nearly all other handbooks, and appears to be inevitable in a book of this kind. This problem is the one which arises from the fact that every contributor naturally tends to write his article as a complete, independent work. As a result, there is occasional duplication of effort, while the length and detailed nature of the articles is not always a reflection of their relative importance. More seriously, some important processes seem to have been bypassed entirely, although it is not clear whether this is by accident or by design. Among the processes which have either been entirely ignored, or given very inadequate treatment might be mentioned: metal spraying and vacuum metallizing, acid dips and activation, stripping, striking, electroforming, immersion and electroless plating, and plating on nonconductors. A second shortcoming lies in the fact that the book shows considerable evidence of careless proofreading. Many of these slips will be obvious and do no harm, such as the statement in the table on p. 33 that one pound (av) = 453.6 grains. Others, however, may not be immediately obvious and could lead to trouble. For example, on p. 214 the formulae for preparing a zinc plating bath from the oxide and from the cyanide have been interchanged in one case, which would lead to improper compounding of the bath no matter which salts were used. The above is a general impression of the book on the reviewer's part. The following are some notes made while reading through the various chapters. Most of the remarks refer to Part I of the book since here the reader may compare this handbook with articles of a similar nature in other texts. The authors of Part II had a more pioneering task, and so fewer remarks will be made by the reviewer except where misleading information was noted, or where the subject was inadequately covered.

Glossary: Very complete, and the best to date of those specifically designed for the plater. Substrate is defined as the basis metal, but the phrase "basis metal" is not included in the glossary (base metal appears, and is defined as the opposite of noble metal). The glossary does not distinguish between chemical polishing and bright dipping, though the author of Chap. 3F (Oxide Removal) does. The definitions of broad concepts, such as electrochemistry, electroplating, etc., are especially good.

Chapter 1: (Tables of Data) These tables appear to be quite complete. Table 3 on chemical compounds is the best in the plating literature to date, though mercurous salts are not given preferred formulae and cuprous oxide was omitted. A few of the tables may be of borderline interest to some readers. Table 16 is not as well handled as it could have been.

Chapter 2: (Design for Plating) This chapter is a bit too brief to realize its maximum potential. It appears to to be aimed more at the specification writer than at the plater.

Chapter 3: (Metal Surface Preparation and Cleaning) A. (Basis Metal Surface) This very brief chapter does a good job of pointing out the present-day lack of fundamental knowledge on the subject, but offers little practical help to the reader. B. (Polishing, Brushing and Buffing) An excellent, practical review replete with cookbook information. Contains considerable up-to-date information, and should serve as a good refresher for even the skilled polisher. The captions of Figs. 4 and 5 appear to be interchanged. C. (Barrel Finishing) Complete and well written, but the first part of the chapter cites only the advantages over wheel and belt methods, while not touching upon any of its disadvantages. D. (Electropolishing) This chapter is very thorough with respect to metallurgy (some very interesting photomicrographs are included), costs and engineering considerations. Perchloric acid baths are curiously slighted in the text though emphasized heavily in some tables. For example, in the introduction the author states that "the comments herein exclude perchloric acid-acetic acid baths . . .," yet in Table 5, out of 19 entries, 8 are to such baths. Table 5 is out of date, though its companion Table 8 is not. There is a good discussion of the handling of the various metals and alloys, and the influence of minor constituents, but a poor description of operating conditions. In particular, not a single bath formula is given in the chapter. E. (Cleaning) This chapter is complete and gives a very logical breakdown of the many factors involved in metal cleaning. In comparison with previous review articles on the subject, it is particularly useful with respect to equipment requirements and design factors. Best bibliography in the handbook, especially on testing procedures. On the whole, solvent cleaning is underplayed relative to alkaline

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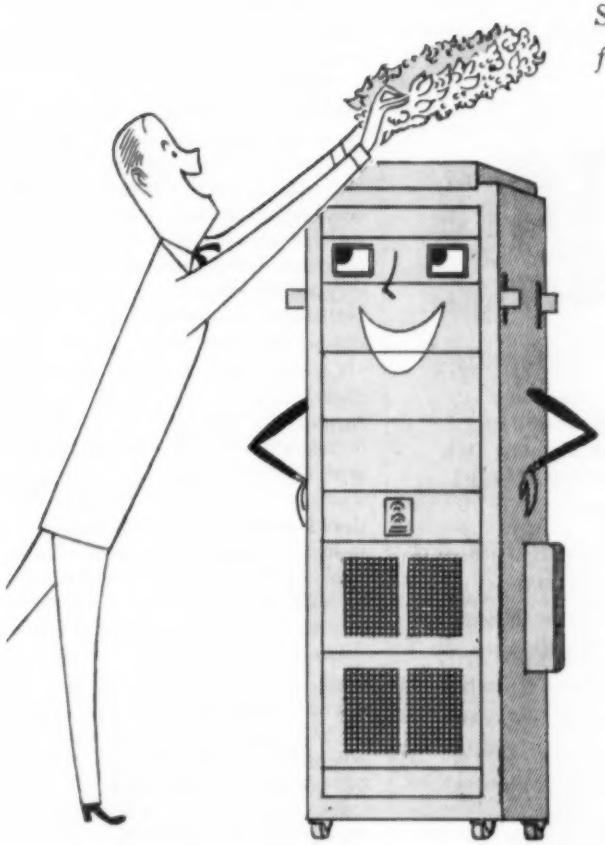

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Book Review

cleaning, and this may tend to give a slightly distorted impression. F. (Oxide Removal) This chapter is complete and up to date. It is especially good on bright dips, offering information on a very wide variety of metals and alloys. The iron pickling section tends to emphasize steel mill practice, rather than the problem of the job plater. There is a good section on materials of construction.

Chapter 4: (Processing and Operating Sequences) The reviewer personally found this one of the best chapters in the handbook. It is the best of its type in the literature, and should be regarded as must reading. Despite the author's comments regarding the difficulty of attempting to write down cycles to meet every possible problem, he has succeeded in presenting an unusual wealth of information in a minimum of space. Naturally, many readers will have "pet" cycles at variance with those of the author, but this should in no way detract from the value of this chapter.

Chapter 5: (Water Requirements) The various treatment methods are well handled, except that the use of sequestering agents is underplayed. The chapter is excellent on costs, equipment and pipe size calculations. It is not too well slanted towards the small job shop.

Chapter 6: (Bath Compositions) This chapter provides a very useful, concise summary of operating conditions for a wide variety of baths. Data on stripping appear to be meager. Some of the more recent widely used proprietary nickel processes are lacking in the reference list. A few of the more recently popular processes, such as tin-zinc, have been overlooked.

Chapter 7: (Specifications) A useful and workmanlike summary which should prove useful as a ready reference.

Chapter 8: (Trouble Shooting) This chapter strikes the reviewer as one of the best of its kind to appear in a book to date. This is admittedly a difficult subject to put into print, and has been well handled. This chapter seems slightly short for its scope (6 pages), and emphasizes nickel, particularly for decorative use.

Chapter 9: (Analysis) This chapter gives the plater an opportunity to analyze any of the common commercial baths with a minimum of time, equipment, and analytical solutions. As such, it should prove an invaluable reference. On the other hand, it covers only volumetric methods, not mentioning colorimetric, chelating, or polarographic methods at all.

Chapter 10: (Testing Electrodeposited Coatings) Considering that this chapter was written by three authors, it shows very good cohesion and is generally well written. There are spots where it seems to the reviewer that there is a lack of cookbook detail, such as in the section on stripping of coatings. The comparison of magnetic methods is a valuable one, and the discussion of visual inspection for defects is unusually thorough.

Chapter 11: (Waste Disposal) This is a thoroughgoing chapter, especially in the discussion of economics. The presentation of data on the comparative costs of various limes (for acid wastes) and of various reducing agents (for chromates) is good. The chemistry of various waste disposal methods is well presented.

Chapter 12: (Plating Costs) This is a good, concise handling of a difficult subject. It should prove a useful tool to enable the plater to explain his cost accounting procedures to other departments, etc.

Chapter 13: (Industrial Hygiene and Safety) This chapter was a distinct disappointment to the reviewer. For one thing, the chapter is much too short (5½ pages). For another, too

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much matter which should appear here was assigned elsewhere in the book, thus robbing the chapter of much of its usefulness. The bibliography, too, is a bit curious. For example, there is no reference to the handbook by Sax, which is one of the most complete available in the field.

Chapter 14: (Metallurgy for the Electroplater) This is a good, useful primer for the electroplater. Its lucid presentation should serve to stimulate interest in the metallurgical aspects of electroplating in many readers.

Chapter 15: (Surface Finishing) A. (Phosphate Coatings) A useful chapter, especially on equipment and cycles. B. (Chromate Conversion Coatings) Complete, especially on types of coatings which may be applied, and on pertinent government specifications. C. (Chromic Acid Anodizing) This section is fairly thorough, and is particularly valuable in the discussion of bath maintenance, and of various rack designs. D. (Sulfuric Acid Anodizing) This chapter is complete, but slightly weak on pretreatment of the basis metal and on equipment. The reviewer would have been inclined to place a little more emphasis on other processes (such as oxalic acid anodizing) than did the author.

Part II: (Chapters 16–36) The majority of the chapters in this engineering section of the handbook are complete, but the plater should be cautioned that these chapters should not be considered as do-it-yourself articles. They are useful guides to plating room engineering, but cannot substitute for an on-the-spot engineering staff, or competent consultant. Chapter 16 (Plant Location and Layout) is much too short to be very useful. Chapter 21 (Racks) is slightly weak on discussing current distribution. Chapter 22 (Manually Operated Installations) is slightly short for its scope. Chapters 23 and 27 (Barrels and Exhaust Systems, respectively) are unusually thorough relative to the other chapters of Part II. Chapter 25 (Continuous Plating Equipment for Steel Mill Products) is likely to be of very restricted application to most readers of the handbook. Chapter 28 (Anodes and Cathodes) strangely slights the use of anodes containing deliberate additions of alloying agents, as in copper and tin plating, thus leaving a somewhat misleading impression. Chapter 31 (PR) seems to belong more logically in the first part of the book, particularly since it deals only with copper plating. Chapter 33 (Drying) is unusual in a book of this kind, and it is very gratifying to see this sometimes neglected subject get the attention it deserves. Chapter 35 (Auxiliary Equipment) is of such a miscellaneous nature that it might better have been left out and absorbed elsewhere in the book.

E. B. Saubestre—Born in New York City on February 26, 1926; attended Newtown High School and then Columbia University where he was graduated with a B.S. degree in 1945. Then came Army service from '45 to '47 and back to Columbia for a Master of Science degree in 1948. He earned his Ph.D. from the same University in 1952.

Saubestre

He is presently with Sylvania Electric as an engineer.

Saubestre is a member of Sigma Chi and Phi Lambda Upsilon. Among technical organizations, he is a member of The Electrochemical Society, ACS, AICHE. The Institute of Metal Finishers (London), ASTM's Committee B-8 and RETMA Committee.

In the AES, in addition to being Librarian of the New York Branch, Saubestre serves on the Research Directing Committee of Project 12. He was AES Fellow for Project 12 in 1950–52.

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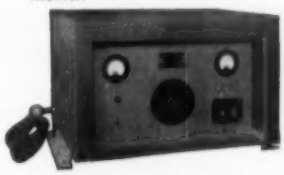

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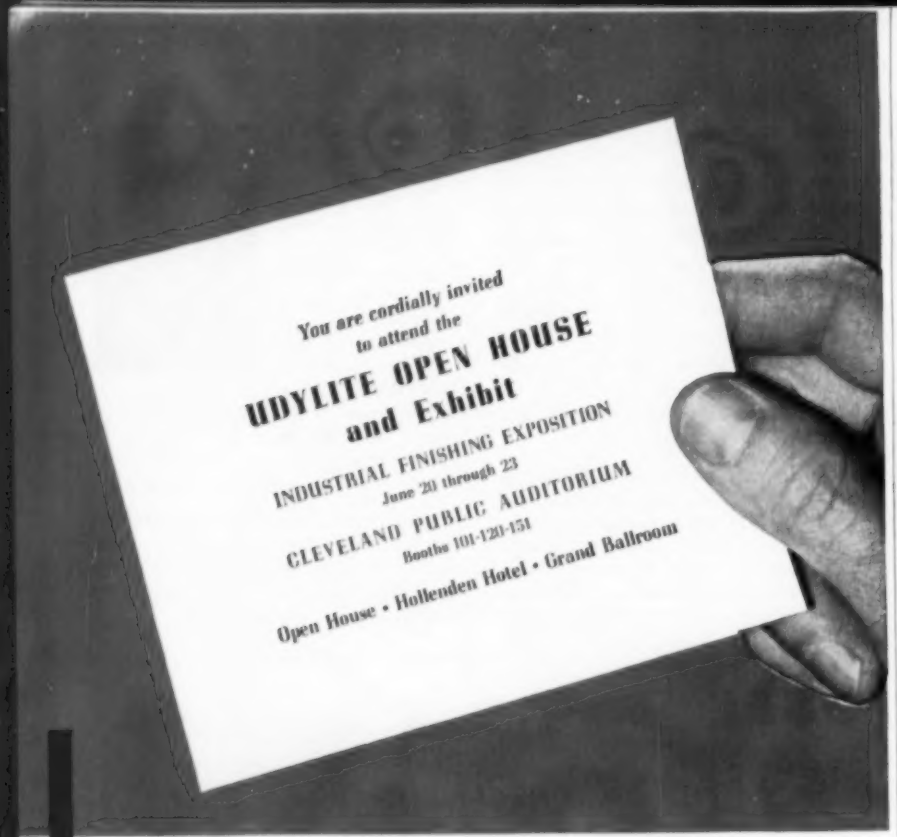

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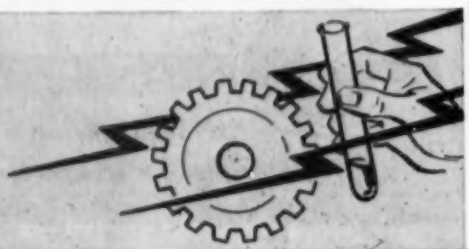

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LETTER FROM FRANCE TO PLATING*

I have never crossed the ocean, and I am a bit ashamed because when I was much younger I had the opportunity to study in the U. S. I let these opportunities go by and regret it today since I could have returned with much information, but I seemed glued to my country's soil.

This opportunity came many years ago when Andre Citroen was sending one or more missions to the U. S. annually. I was his plant consultant on electrolytic operations and he insisted I join a mission and learn about American methods: chrome had just been born and we had much to learn.

In view of my unwillingness, the other members of the mission were asked to make reports on their return. Unfortunately, these reports did not shed the least light on the subject since notes taken by nonspecialists are so cursory that, had we not already formed our opinions, we would have thought the Americans were still in their infancy. We knew better, because of the progress made in plating by the automobile industry among others.

Two anecdotes come to mind which will illustrate my disillusionment in the face of the reports furnished me

One day, the head of one of the Citroen missions called me to the factory after his return from the U. S. and said: "Mr. Darlay, we are asleep in France; I have returned from the U. S. where I noticed that in many auto plants, besides copper, nickel, chrome, they were also depositing zinc on all parts of the car which are not visible, but which must be effectively protected."

Yet, two zinc baths had been operating in our factory for several months but our "missionary" ignored this detail. He had to cross the Atlantic to learn this.

Another time, the Technical Director of the Renault works who had also returned from America called me into his office and revealed that "I saw a very interesting process abroad for bulk nickel plating small parts. In effect, they were placed in a perforated wooden cylinder which revolved in the bath, and the parts became nickel plated without having to be racked, at a great saving in labor cost.

In a word, he had "discovered" the barrel.

I then asked him to follow me to the nickel plating shop where four of these barrels had been in use for this very purpose for several years.

These little misadventures served to encourage me to go on the next Citroen mission, and I had already decided to go

when we had the misfortune of losing our boss.

In small compensation for what I could not see with my own eyes, I have the written word left to me; the bulletin of the AES, magazines like PLATING, and technical works in the field. However, nothing can equal the things one can see on a trip, for the smallest detail does not escape the eye of the expert.

It is precisely these details which can often completely modify a process once they have been reduced to practice by experiments of the type which can be done only in the large industries of America.

In our very small domain of electroplating, we are trying to reach an equal perfection and if, from time to time, we seem to plagiarize it is because American methods are admired, and we would like, if not to equal, at least to approach them, whether it be for an auto, a refrigerator, or an electric razor.

This is why we are indebted to the directors of American industry for opening their doors to us as widely as they do, so that we may visit them to profit from their experience. Our only regret is that we cannot reciprocate, at least in the industrial field. All we can offer is Paris, the Champs-Elysées, the Rue de la Paix and our sincere and cordial friendship.

ANDRÉ DARLAY,
Chief Editor,
Galvano

***This letter reached the editor's desk, written in French, of course. Sylvania's Ed Saubestre (whose French is flawless) was good enough to translate it.**

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A. J. Mitchell, President of the Mitchell-Bradford Chemical Co., manufacturers of BLACK MAGIC blackening processes for ferrous and non-ferrous metals, metal cleaners, rust preventives, plating specialties, and a complete line of heat treating salts, announces the completion of their new modern plant to accommodate increased production, larger office and research facilities.

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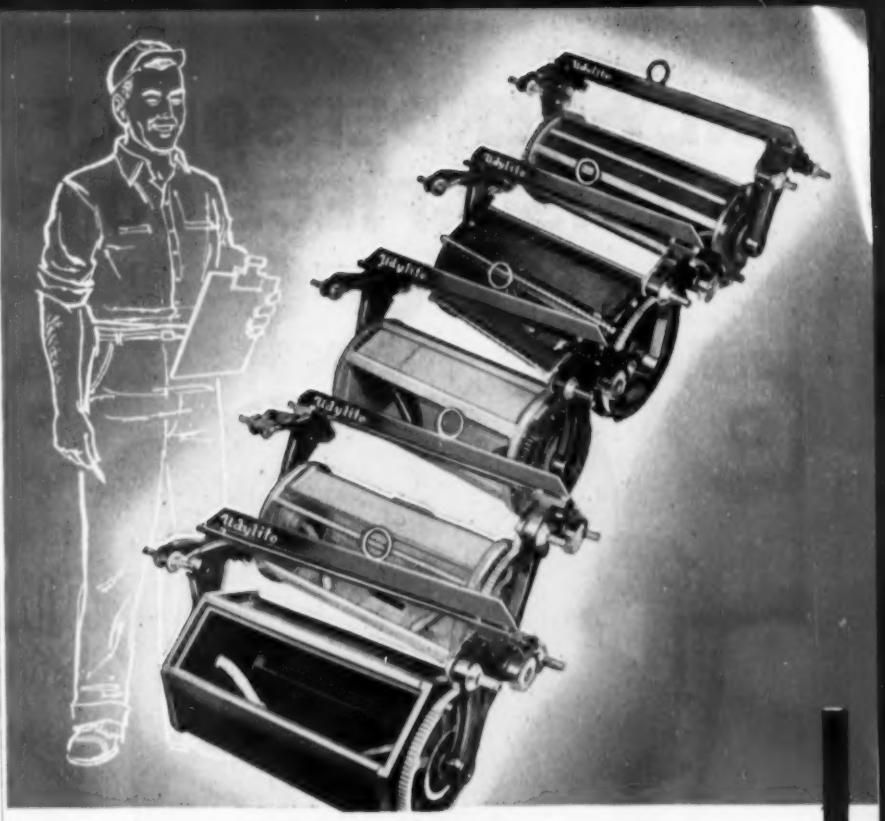

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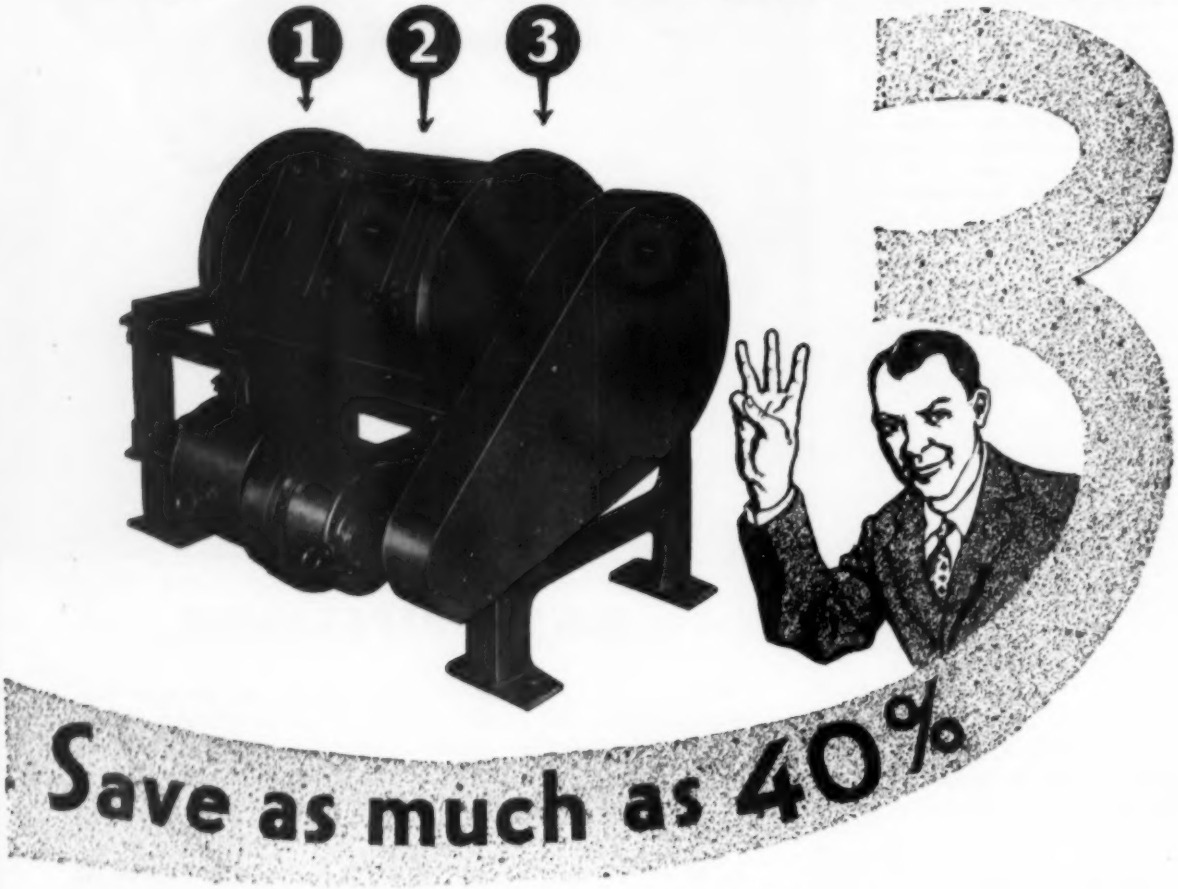

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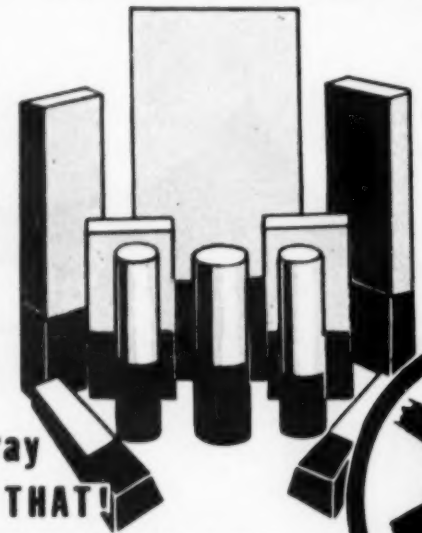

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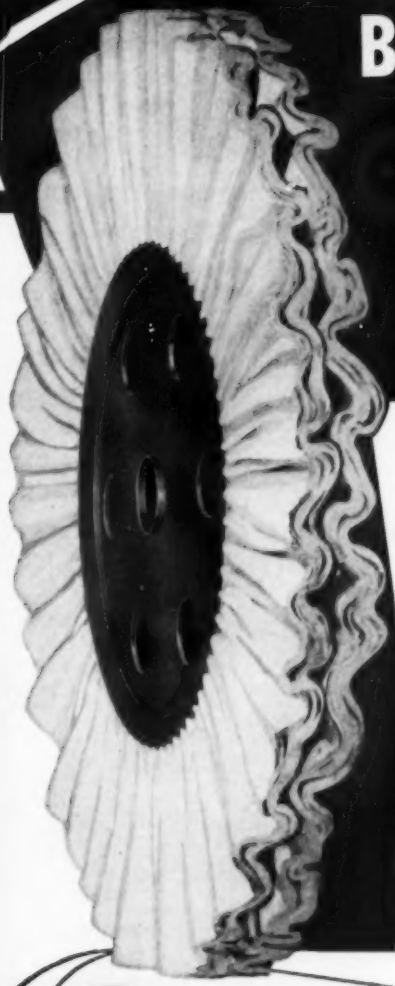

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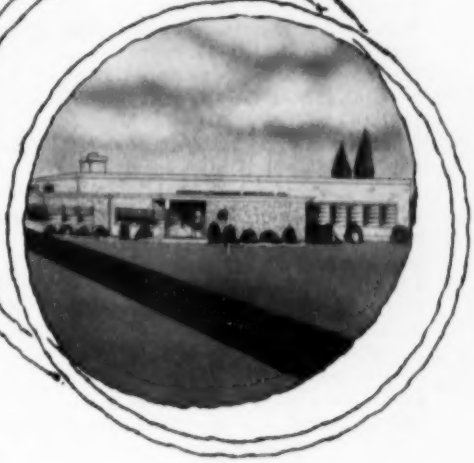

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Intersociety News

ASTM Selects Walter J. Hamburger As its 1955 Marburg Lecturer

Walter J. Hamburger, Director, Fabric Research Laboratories, Inc., Boston, Mass., will deliver the 29th Edgar Marburg Lecture at the 1955 ASTM Annual Meeting at Chalfonte-Haddon Hall, Atlantic City, N. J., at 4:30 P.M., June 29.

This lecture, given at Annual Meetings of the American Society for Testing Materials, originated as a memorial to the first Secretary of the Society and was established to emphasize the importance of furthering knowledge of properties and tests of engineering materials.

Dr. Hamburger's lecture title will be "A Technology for the Analysis, Design and Use of Textile Structures as Engineering Materials." It will trace the chronology of textile craftsmanship during the pre-historic era, early civilization, industrial revolution, and especially development of modern textile science in the brief period encompassing the fourth decade and the early part of the fifth decade of the 20th century. The accomplishments subsequent to Harold De Witt Smith's classic Marburg Lecture, "Textile Fibers—an Engineering Approach to Their Properties and Utilization," will be presented with references to specific abstracts from this 1944 lecture. The newest techniques and equipment employed in the analysis of textiles will be discussed. Mention also will be made of the behavior of textile materials in tension, compression, bending, and torsion. The effects of structural order upon the physical properties of fibers, the effects of fiber properties upon yarn behavior, the effects of geometry upon yarn behavior, the effects of yarn properties and fabric geometry upon fabric behavior and the importance of these behavior characteristics upon objective and subjective functional performance characteristics of textile structures will also be discussed.

Dr. Hamburger has spent a quarter of a century in the textile field and is the author of many technical papers on the subject of textiles. He was graduated from MIT in 1921 with a degree of Bachelor of Science in Mechanical Engineering and obtained his Master of Science in Textile Technology at MIT in 1941. He received his degree of Doctor of Philosophy in Polymer Mechanics at the Polytechnic Institute of Brooklyn in 1948. Lowell Technological Institute awarded him the honorary degree of Master of Science in 1952. From 1922 to 1925 he was engaged in general engineering and from 1925 to 1930 in industrial engineering in the paper industry. Since 1930 his interests have been in textiles. From 1930 until 1944 he was treasurer and technical director of H. Schindler and Co., Inc., Canton, Mass., and since 1942 has been Treasurer and Director of the Fabric Research Laboratories, Inc., Boston. In addition to these activities, he has lectured on textile research and technology in the Textile Division of the Graduate School of MIT and at Simmons College, Boston. From 1949 to 1952 he was Adjunct Professor, Polymer Mechanics, at the Polytechnic Institute of Brooklyn. Since 1950 he has been visiting professor at Lowell Technological Institute. He is a member of Sigma Xi; a Fellow of the Textile Institute, Manchester, England; member of the AATCC, the American Association for Textile Technology, the American Association for the Advancement of Science, and the Fiber Society, Inc. He has been active in Committee D-13 of the American Society for Testing Materials since 1948.

ASTE Charters New Chapters in East and Southwest

Presentation of charters to chapters in Keene, N. H., and Oklahoma City, Okla., has enabled the American Society of Tool Engineers to increase its membership to over 31,000 in the United States and Canada.

The Monadnock ASTE chapter received its charter from Joseph P. Crosby of Hudson, Mass., immediate past president of the Society. Charter chairman of the chapter, which is the Society's 124th, is Donald C. Emery, development engineer for Markem Machine Company.

Arnold Everett of Folding Carrier Company is charter chairman of the Oklahoma City chapter. He received the Society's 125th chapter charter from Harold E. Collins of Houston, Texas, ASTE vice-president.

Monadnock Officers

The Keene area tool engineers have been active for the last three years as an affiliate of the Twin States ASTE chapter. Officers of the new chapter, elected and installed at the Charter banquet, are:

Chairman, Humbert M. Dardani, Miniature Precision Bearing Company, Inc.; first vice-chairman, Richard D. Swahnberg, Kingsbury Machine Tool Corporation; second vice-chairman, James L. Franciscus, Fuller Machine Company, Inc.; secretary, Delmont J. Brown, Markem Machine Company; treasurer, Chester A. Werme, Central Screw Company.

Oklahoma City Officers

The Oklahoma City chapter has more than 100 members from approximately 35 industrial firms. Officers, in addition to Everett, are:

First vice-chairman, C. A. Leslie, Associate Industries; second vice-chairman, W. B. Haney, National Machine Works; secretary, M. A. Winter, Marshall Supply and Equipment Company; treasurer, R. D. Poust, American Iron and Machine Company.

Service to Shuttle Visitors Between Two Shows

Business executives who go to Chicago in September to preview the automatic factory of tomorrow will get an idea of how to beat the traffic problems of today.

A scheduled helicopter passenger service, the first of its kind ever arranged anywhere for exposition visitors, will carry businessmen between Navy Pier, where the Production Engineering Show will be held, and International Amphitheatre, where the Machine Tool Show will be staged.

With more than 100,000 executives expected for the concurrent events, September 6–16, fleets of buses also will operate between Loop hotels and the two exhibition halls, and other buses will operate on round trips between the Pier and the Amphitheatre.

The Machine Tool Show, by far the largest industrial exposition in the country, is sponsored by the National Machine Tool Builders Association and managed by Clapp & Poliak, Inc., New York exposition firm, which also produces and manages the Production Engineering Show.

The latter show, being held for the first time, is bursting full grown on the business world. Devoted to automation and automatic processes, the Production Engineering Show already has leased exhibit space to 175 companies and the total is expected to reach more than 250. In terms of the number of exhibitors, display space occupied and total audience, the show will unquestionably exceed any new industrial exposition ever staged.

ASTM Selects Fritz V. Lenel to Present H. W. Gillett Memorial Lecture

Fritz V. Lenel, Professor of Metallurgical Engineering, Rensselaer Polytechnic Institute, will present the fourth Gillett Memorial Lecture at the 58th Annual Meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall in Atlantic City, on Tuesday afternoon, June 28. The title of Dr. Lenel's lecture will be "Powder Metallurgy—Now (New Techniques, Improved Properties, Wider Use)."

The Gillett Memorial Lecture is jointly sponsored by the American Society for Testing Materials and Battelle Memorial Institute and commemorates Horace W. Gillett, the first Director of Battelle, and one of America's leading technologists and metallurgists. Each year it covers a subject pertaining to the development, testing, evaluation, and application of metals.

In discussing his topic of metal powders and compacts, Dr. Lenel will review growth of powder metallurgy as a method of fabrication for metal products since World War II. He will discuss advances in the field of "structural parts," components which are molded into a shape

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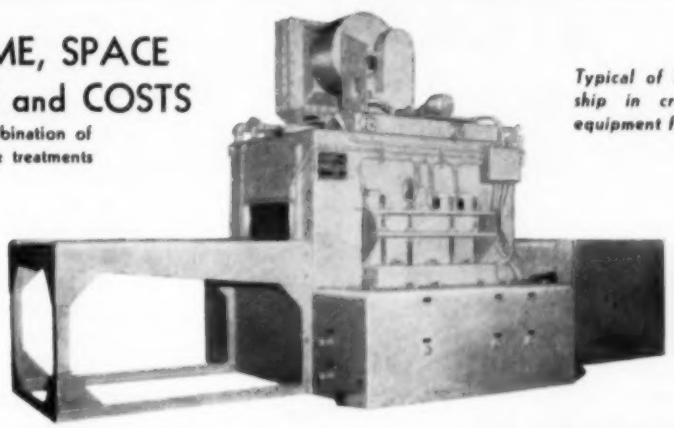

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Intersociety News

exactly or at least nearly the ones in which they are to be used in the final assembly. Other techniques which will be discussed in Dr. Lenel's lecture are those for making from powder semifabricated products, extrusions, forgings, sheet, rod, or wire which have properties superior to those made by fusion metallurgy—techniques which have been particularly successful in the field of light metals. A remarkable development to be described is the so-called SAP process for making aluminum forgings, sheets, and extrusions from aluminum flake powders which have elevated temperature properties much superior to those of a cast or wrought aluminum product. The so-called cermets, materials which are prepared from combinations of metal and ceramic powders, which appear to have appreciable strength at temperatures above 1600° F where base metal alloys are weak, will also be discussed.

Dr. Lenel was born in Kiel, Germany, and received his degree of Doctor of Philosophy from the University of Heidelberg. Coming to this country in 1933, he has been engaged in research and development work in the field of powder metallurgy. He has been a member of the teaching staff of Rensselaer Polytechnic Institute, Troy, N. Y., since 1947. Dr. Lenel has devoted considerable time to projects on powder metallurgy sponsored by the armed forces and by industry. He has written numerous papers in this field. As a member of ASTM, he has been active on Committee B-9 on Metal Powders and Metal Powder Products. Dr. Lenel is also a member of Sigma Xi, Phi Lambda Upsilon, the American Society for Metals, the American Institute of Mining and Metallurgical Engineers, the Institute of Metals of Great Britain, and the American Society for Engineering Education.

Dr. Harold J. Dawe on Solid Lubricants at Chicago ASLE

"Characteristics and Performance of Solid Lubricants" was the subject of a talk by Dr. Harold J. Dawe, Director of Research, Acheson Colloids Company, Port Huron, Mich., before the Chicago section of the American Society of Lubrication Engineers, at the Builders Club, 228 N. La Salle St., on April 7th. Dr. Dawe, a national authority on colloidal graphite and solid lubricants, was the featured speaker of the meeting.

Dr. Dawe, in his talk, pointed out that "lubrication is tied in closely with the theories of metallic friction." The welding-shearing theory, according to Dr. Dawe is the most generally accepted one to explain the greater part of metallic friction, and is of considerable importance in considering machine lubrication. Even in systems designed for hydrodynamic lubrication, any lack of adequate fluid lubricant or too heavy a load results in "boundary" conditions. Mixed types of lubricants—liquids plus solids—help solve the problems of boundary lubrication. The properties of graphite or molybdenum disulfide make these materials especially advantageous for most conditions where lubrication is difficult.

In colloidal form these solid lubricants are dispersed in fluid lubricants or volatile carriers, and are carried to all working parts of machinery, exposed or unexposed, in regulated amounts.

Dr. Dawe went on to describe the physical and chemical properties of various lubricating solids and to cite important industrial applications where dispersions of these compounds are successfully used.

"Where boundary conditions exist," Dr. Dawe concluded, "where loads are high and where high temperatures eliminate fluids, solid lubricants play an ever increasing role in industry."

ASTM Committee B-8 on Electrodeposited Metallic Coatings

Committee B-8 met February 3 and 4 in Cincinnati during ASTM Committee Week. One of the most important developments under consideration in the committee is the crystallization of final plans for the Symposium on Properties and Performance of Electrodeposited Coatings to be held during the 1956 Spring Meeting in Buffalo. The Symposium will comprise eight papers including papers on exposure tests and results, thickness, luster, salt spray tests, metal cleaning, conversion coatings, and the comparison of zinc and cadmium plated deposits. This Symposium will be repeated at the ASTM National Meeting to be held in Los Angeles in September 1956.

A special task group reported that the results of a survey do not (!) indicate sufficient interest at the present time for the

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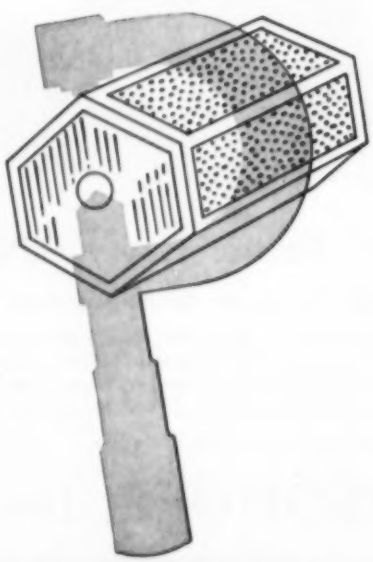

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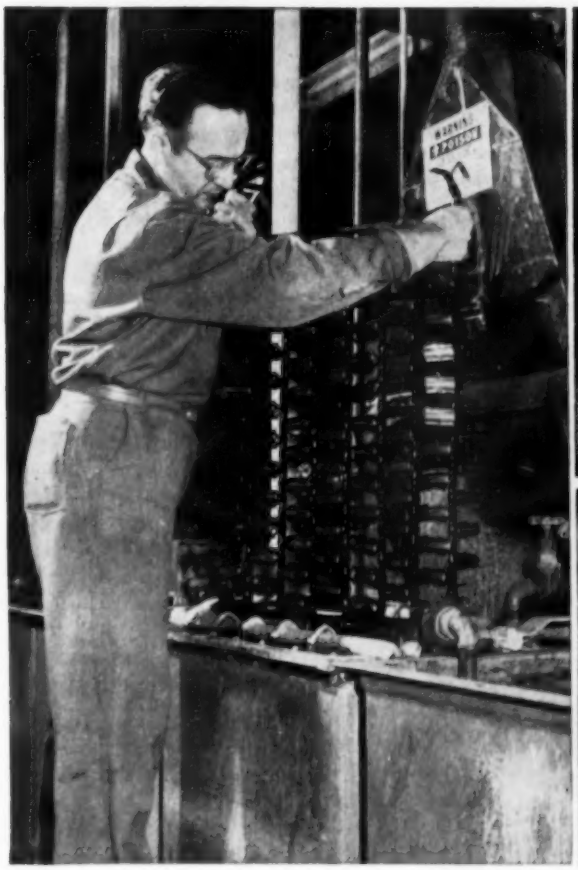

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Intersociety News

preparation of specifications for plating metals. A new task group has been appointed to write specifications on nickel deposits produced by chemical reduction methods, better known as "electroless" nickel.

Newly Formed Society of Die Casting Engineers

A new technical society, named the Society of Die Casting Engineers, has been formed to foster and further technological advances in the field of die casting and finishing of metals and die molding of plastics and powdered metals.

The main objective of the new Society will be the exchange, accumulation and dissemination of the latest information and knowledge in the arts and sciences of die casting and related arts. A major aim is the development of modern standards for the die casting industry.

The first chapter to be formed within the new organization is the Detroit No. 1 chapter. Officers of the new group for the calendar year 1955 are: president, Harris Shimel of Chevrolet-Bay City; vice president, Marshall Aberle of H & M Industries; secretary, George Griffenham of Mergraf Oil Co.; recording secretary, John Lapin of Saginaw Bay Industries; treasurer, Arthur Tinetti of A. C. Spark Plug; librarian and historian, Mike Tenenbaum of Lester Phoenix Machine Co., and trustees, Harry Ericksen of A. C. Spark Plug; Herbert Roushkolb of Cleveland Automatic Machine Co., and John Miller of H & M Industries.

The new Society's national headquarters and offices will be located at 19370 James Couzens Highway, Detroit 35, Mich.

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Plans for ASTM 58th Annual Meeting

A wide range of subjects relating to research and testing of engineering materials will be discussed at the 58th Annual Meeting of the American Society for Testing Materials to be held at Chalfonte-Haddon Hall, Atlantic City, N. J., June 26–July 1. A total of 30 sessions are now scheduled beginning on Monday morning and continuing until Friday noon. Six symposiums are scheduled on the following subjects: impact, judgment factors in soils testing, significance of tests of concrete, high purity water corrosion, speed of testing and metallic materials for service above 1600° F. In addition, sessions are scheduled at which individual papers will be given on the subjects of soils, nonferrous metals, steel, testing of materials, and fatigue.

Important on each year's program are two lectures, the Edgar Marburg Lecture and the Gillett Memorial Lecture. The Marburg Lecture this year will be given by Dr. Walter J. Hamburger, Director, Fabric Research Laboratory, Inc., Boston, Mass., on the subject of textile fibers. Dr. Fritz V. Lenel, Rensselaer Polytechnic Institute, will give the Gillett Memorial Lecture on metal powders.

Important in the Society's activities are the large number of technical committee meetings which are scheduled. Forty-five committees and their subcommittees will hold a total of about 450 meetings.

On Wednesday evening, June 29, the annual dinner will provide a "break" in a week otherwise devoted to intensive technical activity. Entertainment will include a floor show and dancing.

The Philadelphia District Council, as host for the meeting, is planning an attractive program of ladies entertainment for the many wives who will accompany their husbands to Atlantic City.

Chairmen of the Annual Meeting subcommittees of the Philadelphia District are:

Edward J. Albert, Dinner and Dinner Entertainment Committee

Tinius Olsen, 2d, Ladies' Entertainment Committee

A. O. Schaefer, Finance Committee

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Books

Please enclose check or money order when ordering any books listed below. Address Book Department, American Electroplaters Society, 445 Broad Street, Newark 2, N. J.

THE FILTRATION AND PUMPING OF PLATING SOLUTIONS

by G. T. COLEGATE
56 pp.
AES Members 85c
Non-members $1

Discusses the causes and effects of suspended matter, choice of filter and accessories, valves, practical operation and general arrangement of the filter system, continuous filtration, filter aids and filtration using activated carbon; bag filters, anode bags, diaphragm tanks, the filter press, filter cloths, precoated filters, notes on precoating, uncoated filter packs, candle sleeves, sleeve-type filters used without filter aid, and temperature control as part of the filtration system; air, diaphragm, gear, centrifugal and Mono pumps.

WATER SUPPLY AND WASTE-WATER DISPOSAL

by G. M. FAIR,
Harvard University
and
J. C. GEYER,
The Johns Hopkins University

Here is the first single volume to cover ALL the important principles. The work emphasizes the technology and scientific principles upon which the form and function of water and wastewater systems are built. Almost every chapter contains material that has never before appeard in a book on water and sewage.

1954. 973 pp. Illus.
$15.00

EFFECT OF IMPURITIES AND PURIFICATION OF ELECTROPLATING SOLUTIONS

by D. T. EWING AND ASSOCIATES
Research Report Serial No. 23

I. Nickel Solutions
3. Purification of Solutions, Methods of Operation and Testing of Deposits
4. The Effects and Removal of Copper
5. The Effects and Removal of Zinc
6. The Effects and Removal of Iron

48 pp. Price: $1.25

CHROMIUM PLATING

by PAUL MORISSET,
J. W. OSWALD, A.R.I.C., A.I.M.,
C. R. DRAPER, A.I.M., F.C.S.,
R. PINNER, B.Sc.

584 pp.—222 illustrations
67 tables—425 references
AES Members $9.50
Non-members $11

DISPOSAL OF PLATING ROOM WASTES

by B. F. DODGE AND W. ZABBAN
Research Report Serial No. 22

III. Treatment with Hypochlorites and Removal of Cyanates
V. Batch Volatilization of Hydrogen Cyanide From Aqueous Solutions of Cyanides

88 pp. Price: $1.75

FOR YOUR AES LIBRARY

Two books, "Principles of Electroplating and Electroforming" by Blum and Hogaboom and "Modern Electroplating" by Allen G. Gray are offered for sale through your national headquarters:

The first, $5.95 to members
7.00 to non-members
The second, 8.25 to members
9.50 to non-members

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Their Treatment and Disposal

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New Jersey Agricultural Experimental Station

ACS Monograph No. 118

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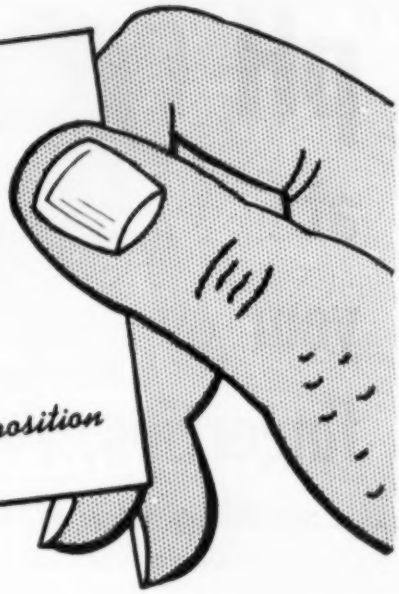

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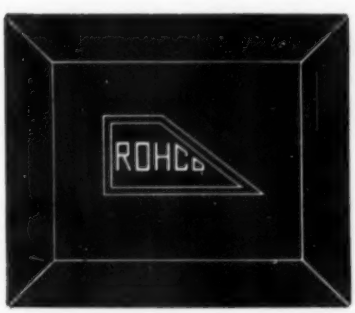

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Books

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Contains 265 methods, many new, for the determination of principal constituents and major impurities in electroplating solutions, pickles, dips and etches, phosphating solutions and electro-brighteners, together with chapters on sampling, the control of cleaners, etc., the analysis of plating salts and of water, physical and physico-chemical methods of analysis, the preparation of standard solutions, and a good selection of tables.

387 pp. XI Published 1952
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Two New Processes By General Ultrasonics

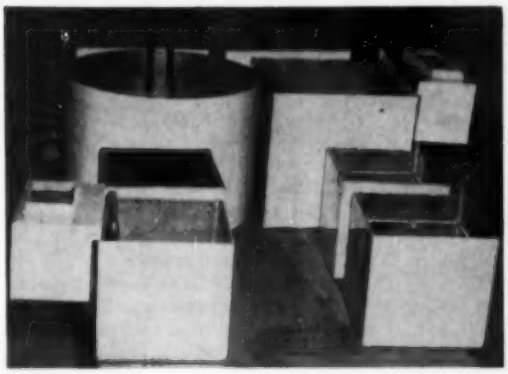
Sonistrip and Soniplate

Two new processes involving ultrasonic radiation in liquids have been announced by the General Ultrasonics Company, Hartford, Conn.

The **Sonistrip Process** greatly accelerates and improves the efficiency of pickling and descaling of metals in acids and caustics. Welded stainless steel Sonicells are immersed in acid or caustic solutions and radiate ultrasonic vibrations at 19,800 cycles per second. This greatly accelerates the effect of the solution by exposing all surfaces of the work to ultrasonic agitation. Interior surfaces and deep crevices are pickled or descaled in the same time as required for the outer surface. Thus effective rust and scale removal is accomplished in 10 to 90 seconds compared with 10 minutes to an hour by previous methods.

The **Soniplate Process** accelerates and improves electroplating and electroless plating by introducing ultrasonic vibrations into the plating bath. If required by the characteristics of the solution, the stainless steel Sonicells can be further protected by resin coating. The vibrations and accompanying "cavitation" cause rapid replacement of the exhausted or saturated liquid layers ordinarily surrounding anode and cathode, and increases of 2 to 100 times in plating current density without "burning" have been noted. Edge build up is eliminated or minimized. Throwing power is increased. Anode polarization is eliminated. Grease, rust or dirt, which may remain on the work, are simultaneously removed by ultrasonic action, and the result is better plating and fewer rejects.

Ultrasonic cleaning has been known for some time, but the key to these new practical pickling, descaling and plating processes is the new line of stainless steel, hermetically sealed Sonicells which can be immersed in corrosive or conductive liquids and are therefore useful for many processes impossible for earlier types of transducers. These Sonicells are usable in arrays and can therefore be arranged as necessary for use in new or existing tanks of any size. For small scale production they are powered by electronic generators and in larger arrays are driven by motor-alternator equipment which can be furnished with any required power output.



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AES News

George B. Hogaboom Memorial Paper Award

The AES Executive Board approved a recent request from the Hartford branch

Hogaboom

to sponsor a George B. Hogaboom Memorial paper award in honor of the late G. B. Hogaboom of New Britain, Conn.

This award, effective 1956, will be co-sponsored by the Supreme Society and the Hartford branch. It will replace the AES Silver Medal award and will be presented for the second best paper printed in Society publications yearly. In addition, the cash award will be increased to $50. A certificate and a silver medal will also accompany this award.

AES Executive Board Meets

A three-day session of the Executive Board was divided between National Headquarters in Newark and the Hotel Statler in New York, April 21–23, with Dr. R. A. Schaefer presiding.

Most important items acted upon included the approval of the George B. Hogaboom Memorial Paper Award in honor of the late George B. Hogaboom, replacing the AES Silver Medal for the second best paper; authorization to publish convention papers in PLATING prior to a convention; approval of a plan to join the Audit Bureau of Circulation to assist PLATING in its accelerated advertising program; confirmation of four nominations to the Editorial Board; authorization to publish research articles in Annual Proceedings, effective 1956; approval of a lease for additional headquarters space to accommodate the production office which was moved from Philadelphia recently; and the review of the Society budget and PLATING estimate for 1955–1956.

Reports were heard from E. Combs, General Chairman of the Cleveland Convention Committee, PLATING Editor, A. Doria, Advertising Manager H. G. Burnley and Executive Secretary P. P. Kovatis.

Permanent charters were also voted for the Seattle-Puget Sound and Southern Tier branches.

Empire State Regional Meeting

After a welcome by Edwin Wallin, President of the Rochester Branch in whose city the 1955 Regional Meeting was held on April 16, Frank O. Beuckman took over as presiding chairman. This successful and interesting meeting will set a standard for the Regionals to be held in Buffalo (1956), Syracuse (1957) and Southern Tier (1958).

At the educational session, Dodd Carr of Bart Manufacturing Co. spoke on "Nickel Electroforming"; Cleve Nixon of General Motors gave a talk on "Out-of-Door Durability of Decorative Plating"; and D. R. Meserve of United Chromium delivered a paper on "Vinyl Coatings in the Plating Industry."

There was a fascinating program for the women. They were entertained throughout the afternoon and it was questionable that they might break up in time to prepare for the excellent banquet that followed.

L to r: Wallin, Meserve, Nixon, Carr, Beuckman

In addition to the Branch President's introductory remarks, National President Ralph Schaefer and Executive Secretary Peter Kovatis spoke at the banquet.

Research Committee, April Meeting

On April 15, 1955 the Research Committee met in the Hotel Seneca in Rochester. Chairman Serfass presided over a meeting at which were present: L. Borchert, E. Parker, M. Diggin, W. Blum, AES President Schaefer, A. DuRose, A. Wrisberg, E. Bowerman and Secretary Kovatis. Also present by invitation were: E. Wallin, W. Tucker and C. Van Epps.

The meeting was marked by enormous accomplishments among which must be mentioned a report of progress by Dr. Serfass on the new project located at the University of Pennsylvania. "Mechanism of Electrodeposition." Dr. Serfass pointed out that the Project Director is Dr. John O'M Bockris; the Fellow will be Dr. Wolfgang Mehl from Germany who will ar-

New Appointments to AES Research Committee and PLATING Editorial Board

Seven new members to the Society's Research Committee and to PLATING's Editorial Board were confirmed by the Executive Board at its recent meeting. They are as follows: Research Committee—Robert A. Ehrhardt, Bell Telephone Laboratories, Murray Hill, N. J.; George E. Best, Mutual Chemical Corp., Baltimore, Md.; Dr. Walter R. Meyer, Enthone, Inc., New Haven, Conn.; Editorial Board—Russel Harr, Western Electric, Chicago, Ill.; AES Past President Arthur W. Logozzo, Nutmeg Chrome Corp., West Hartford, Conn.; John B. Capuano, Udylite Corp., Detroit, Mich.; and advisor, F. L. Scott, United Chromium Corp., Carteret, N. J.

Outgoing members of both committees include Dr. Earl J. Serfass, E. R. Bowerman, Jr., Myron B. Diggin, Research Committee; E. R. Bowerman, Jr., W. Geissman, C. Ostrander and Dr. G. Klinkenstein, Editorial Board.

New members will take office at the Cleveland Convention.

Best Ehrhardt Logozzo Capuano Meyer Scott Harr

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"OLD KOSMOS"

AES News

rive circa September 15. This is designated as Project No. 16, and is under the supervision of Dr. R. A. Schaefer with the Project Directing Subcommittee comprised of E. Bowerman, Chairman; W. Blum and O. Kardos.

Project No. 17 was also discussed. This one is titled "Microthrowing Power," and is located at the Institute of Scientific Research, Richmond, Va. In this case, the Project Director is Dr. H. Leidheiser, Jr., and the Project Directing Subcommittee are Dr. W. Meyers, Chairman; W. McKay and A. Du Rose. The Project Director is again Dr. R. A. Schaefer.

Ed Bowerman reported on "Reflectance Measurements and Surface Characterizations, Task Committee," and stated that the University of Rochester is very much interested in this project as is the ASTM who would like to obtain data for the purpose of setting up appropriate standards and specifications.

L. Borchert reported that C. Kelly is to meet with the Chicago group of CEPI, and he will take up the matter of the possibility of a Buffing and Polishing Project with that group.

Borchert's report on the research booth at the Cleveland IFE was heartening to the committee. Projects 12, 14, 15 and 5 will be featured; a splasher machine made of lucite will be used on the table in the booth. In all, the exhibits planned are most exciting and informative and will include charts, samples, graphs, pictures and colored slides.

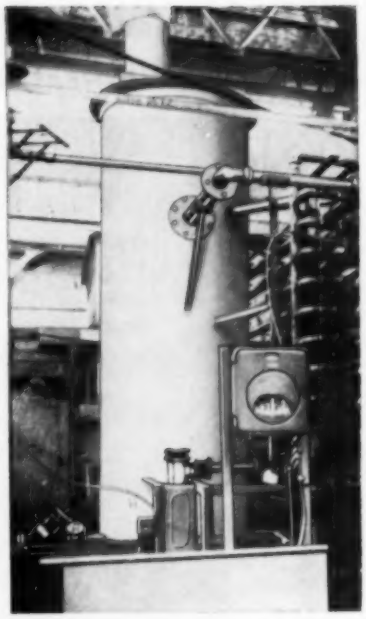
Myron Diggin reported that he is still collecting information on the proposal and that he will present it at the next meeting.

All in all, the tenor and atmosphere of this meeting reflected the characteristics which have come to be connected with the Research Committee. The meeting was lively, interesting, exciting and one in which great decisions were reached. The work of this committee, by its very nature, brings great progress, reputation, inestimable stability to the American Electroplaters' Society.

Chairman Serfass expressed the thanks and appreciation on behalf of the Research Committee for the fine hospitality and warm welcome accorded the Committee by the Rochester Branch.

JOHN FEELEY

On April 30, 1955 John Feeley, an honorary member of the AES, passed away. He was seventy-eight and death came after a prolonged illness. He had been a member of the Montreal Branch. Services were held on May 3 at St. Patrick's Church.



Chromic Acid Concentrator

The unit illustrated above is a chromic acid concentrator in use in a large Ohio plating plant. The system of which this unit is the heart is currently recovering 55% of chromic acid formerly lost thru dragout. The plant estimates a $1,650 monthly savings on ferrous sulphate used for treatment, and a $2,500 monthly savings in reduced chromic acid consumption. These figures, however, would vary from operation to operation. In addition to the above advantages, the problem of waste disposal is considerably reduced.

Designed and built by Maurice A. Knight, the unit, the first of its type, has a Sealon lining which has excellent resistance to the corrosive action of plating solutions. Concentrators of this type are also being used for concentrating solutions of nickel plating salts, and may be used for concentrating other plating solutions.

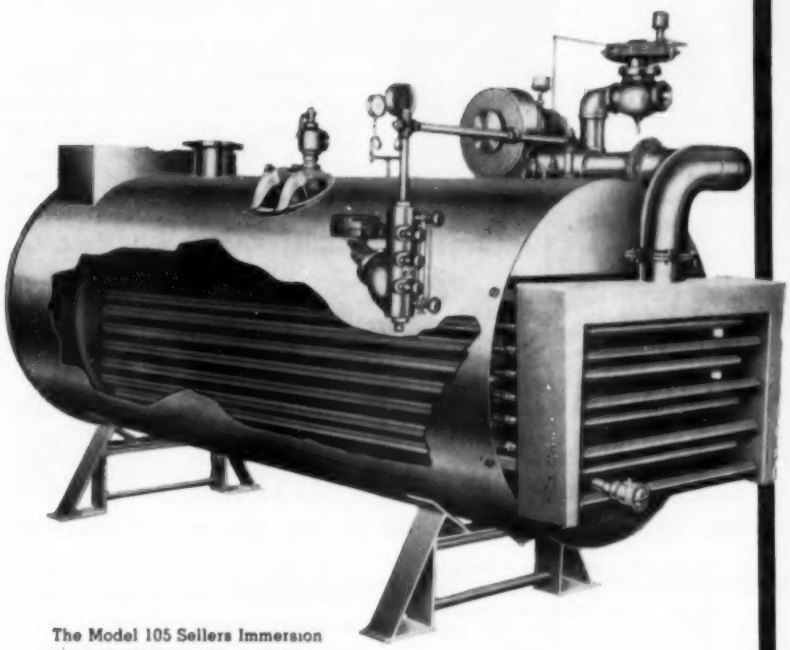
Write for further information regarding the use of a Knight concentrator in your operation.

MAURICE A. KNIGHT
Kelly Ave., Akron 9, Ohio

Acid and Alkali-proof Chemical Equipment

There's a good reason why

SELLERS BURNS GAS "INSIDE THE WATER"



The Model 105 Sellers Immersion Steam Boiler is another steam boiler designed and built with totally submerged and horizontally located firing tubes.

This system of firing permits all gas to be burned inside the submerged tubes — and therefore *inside the water.*

Every tube is an individual combustion chamber with its own burner — *completely surrounded by water.* This is the most efficient method ever devised.

And this system permits "spreading out the fire" — to put every square foot of heating surface to work, increasing life, internal circulation, and operating efficiency.

The Sellers Model 105 Immersion Steam Boiler is only one of a complete line — all are companion boilers to the famous Sellers Model 46. Investigate this line — there is one to fit your requirements.

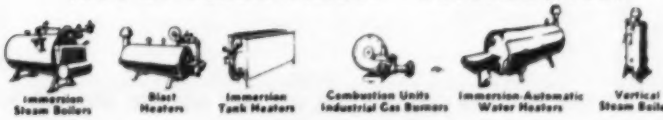
BEFORE YOU BUY ANY STEAM BOILER, CONSIDER THESE FACTS

- ***MINIMUM SCALE PROBLEM***
  Intermittent firing of the boiler brings about alternate expansion and contraction of the firing tubes which loosens scale which might form on the tubes. This scale drops to the bottom of the shell out of the firing zone and cannot bake on to the firing tubes. Clean out openings are provided.
- ***CONTINUED HIGH EFFICIENCY***
  As long as firing tubes are kept clean, original high efficiency is economically maintained.
- ***NO WATERLINE CORROSION***
  With all firing tubes totally submerged, there is no corrosion at the waterline—where tubes normally fail. In Sellers immersion type steam boilers, there can be no waterline corrosion.
- ***MORE EFFECTIVE INSULATION***
  More effective insulation is possible because the insulation is against heat loss from low temperature steam and water instead of a high temperature combustion chamber.
- ***FASTER STEAMING AND DRYER STEAM***
  Rapid steaming and dry steam takes place because of the large surface area of the water. All surface water is heated first since the firing tubes are located close to the water line.

Sellers

ENGINEERING COMPANY

4876 N. CLARK STREET CHICAGO, ILL.



Save Dollars Now!

SELLERS ENGINEERING COMPANY
4876 N. Clark Street
Chicago, Illinois

☐ Please send us complete information on the Sellers 105 Model Steam Boiler.
☐ Send us the Tell-All folder on the Sellers complete line of steam boilers.

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Company_____

Address_____

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The original bright conversion coating for zinc and cadmium

NOW PROUDLY OFFERS ALUMINUM PROTECTION

in either clear or colored finishes with

New **Luster-on®** Aluminum Sealer

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- Gives salt spray resistance to 600 hours
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57 WALTHAM AVENUE, SPRINGFIELD 9, MASS.

AES News

Buehler to Aid Burnley on PLATING Ad Staff

Robert F. Buehler of New York City was named to the newly created position of Assistant Advertising Manager of PLATING, it was announced by AES Executive Secretary P. P. Kovatis this month. Buehler will work under the direction of Advertising Manager H. George Burnley in an effort to meet the needs of an expanded Advertising program.

Buehler

The new Assistant Advertising Manager has been assigned territory which comprises New York, New Jersey, Pennsylvania, Maryland, Delaware, Washington, D. C., and the New England states. His office is at 445 Broad Street, Newark, N. J., main office of PLATING and the AES.

Before joining PLATING, Buehler was associated for five years with Chain Store Age publications as an advertising space salesman.

A veteran of World War II, Buehler served with the U. S. Navy. After three years duty in the North Pacific theatre of operations, he was honorably discharged in 1946. He is a graduate of the New York University School of Commerce, where he obtained his Bachelor of Science degree in 1949.

ELIMINATE UPS & DOWNS

GET BETTER LEVELING WITH...

ELECTRO-GLO ELECTROPOLISHING

SEE THE LATEST AT BOOTH 447, IFE • CLEVELAND

Electro-Glo electro-polishing concentrates mean savings to you in Time, Labor and Production Costs. Brightens, smooths and deburrs in one simple operation.

Copper Alloys	ELECTRO-GLO #200
Austenitic Stainless Steel	ELECTRO-GLO #300
Martensitic Stainless Steel	ELECTRO-GLO #400
Carbon Steel	FERRO-GLO #500

WRITE FOR DETAILS AND NEAREST DISTRIBUTOR

Electro-Glo COMPANY
1430 S. TALMAN AVE.
CHICAGO 8, ILLINOIS

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE B 619.

MEMO

for better immersion heaters -

Designed for your acid pickling and electroplating solutions or other acid baths.

This compact electric immersion heater unit is made of VITREOSIL® (pure fused silica) with corrosion-resistant cap. Designed for increased heat transfer per unit area; offers greater resistance to chemical attack. Ground wire inside VITREOSIL sheath for additional protection. Minimum safe immersion depth marked on sheath.

VITREOSIL heaters can be custom designed for special applications. Write today for Technical Bulletin 19 and prices.

THERMAL AMERICAN FUSED QUARTZ CO., INC.

18-20 Salem Street Dover, New Jersey

Company _____

Name and Title _____

Street _____

City _____ Zone ____ State _____

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE B 620.

AGATEEN

All you

"GUYS and DOLLS"

in the AES

are cordially invited to visit our Hospitality Headquarters at the Statler Hotel in Cleveland during the Annual Convention of the American Electroplaters Society.

Will greet you there in person.

BILL CHACE

AGATE LACQUER MANUFACTURING CO., INC.

SERVING INDUSTRY SINCE 1927

11-13 43rd Road
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AGATEEN
THE LAST WORD IN QUALITY

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BUYING
SELLING

NICKEL

ANODES • CATHODES • SCRAP

Jefferson Metal Co.

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USE READER SERVICE CARD; INDICATE B 623.

A New Prime Source
"Serving the Electroplating Industry"

NICKEL ANODES

"Rolled or Cast—All Lengths"

Prompt Shipment—Highest Quality

NICKEL SULFATE
CARBONATE
CHLORIDE

—CADMIUM BALL ANODES—

Order Now and Save

	Per lb.
POTASSIUM CYANIDE (Sulfur-free)	$ .44
SODIUM CYANIDE	.185
COPPER CYANIDE	.68
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BETTER PRICES ICD QUALITY SERVICE

INDUSTRIAL CHEMICAL & DYE CO.

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CANTON PLATERS SUPPLY COMPANY

and

BISON CORPORATION

1935 Allen Avenue, S. E.
Canton, Ohio

Greets and welcomes you

to the

1955 Exposition and Convention

USE READER SERVICE CARD; INDICATE B 624.

Over 70 Years

TRADE
MATCHLESS
MARK

COMPOUNDS

Over 70 Years of Experience in the manufacture and development of polishing and buffing compounds. Compounds that

Reduce Compound Use

Reduce Buff Use

Reduce Labor Costs

Reduce Rejects

Increase Production

Improve Cleaning

and in many cases completely eliminate all cleaning difficulties.

Over 70 Years Experience
At Your Service

THE MATCHLESS METAL POLISH CO.

840 W. 49th Place
Chicago 9, Ill.

726 Bloomfield Ave.
Glen Ridge, N. J.

USE READER SERVICE CARD; INDICATE B 625.

—It's New-Penny Bright!

COP-BRITE

NEW, BRIGHT COPPER PROCESS

FOR ALL BARREL AND STILL CYANIDE SOLUTIONS

A One-Material Brightener

- Yields a faster, brighter finish
- Produces a softer, smoother deposit
- Eliminates cyanide fumes
- Provides greater economy

Information on Request

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153 East 26th Street, New York 10, N. Y.
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USE READER SERVICE CARD; INDICATE B 626.

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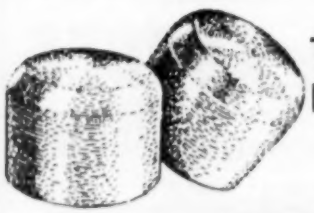

They're Fused!
DUST FREE
POTASSIUM CYANIDE

*Cya. NODES

Half-Ounce Cast Cylinders for All Electroplating Uses

Cya. NODES cost no more than powdered cyanide and they are HIGH IN PURITY . . . SULFUR FREE (97.99% minimum) • EASIER TO USE . . . SAFER TO HANDLE (No storage or weighing problems) • DUST FREE . . . NON-FLAKING • QUICKLY SOLUBLE . . . UNIFORM IN SIZE (Time and effort saved). See for yourself how Cya. NODES perform.

In stock for immediate delivery—ORDER TODAY

5 Stock Points — Chicago • New York • Detroit • Grand Rapids • Milwaukee

VISIT OUR BOOTH No. 358—INDUSTRIAL FINISHING EXPOSITION—Win Valuable Prizes—Free Gifts to All

Kaynide Division

KRAFT CHEMICAL COMPANY

919 West 18th Street — Chicago 8, Illinois

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A magnetic thickness tester . . .

POCKET **HANDI-GAGE**

Tests thicknesses from 0.0001 to 0.015 inch. Each individual gage is separately calibrated to National Bureau of Standards thickness plates, resulting in an accuracy to 10% for thicknesses over 0.0002 inch. As simple to use as an automobile tire gage, the Pocket Handi-Gage may be used on the production line or in the laboratory. It's perfect for use as a "Go, No-Go" thickness gage at the plating tank or spray booth.

SEE IT DEMONSTRATED
BOOTH 347 CLEVELAND SHOW

Tests brass, cadmium, copper, lead, nickel, silver, tin, zinc, lead-tin and zinc-tin alloys, hot dipped tin and zinc, paint, plastic laminations, enamel and lacquer on steel and other magnetic metals. Gives results in SECONDS. Especially adapted for hard-to-reach areas. Comes in a pocket-sized case complete with magnets for various thickness ranges.

Platers Research Corporation

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USE READER SERVICE CARD; INDICATE B 628.

KNIGHT PLATING COMPANY

Production Plating of Small Parts

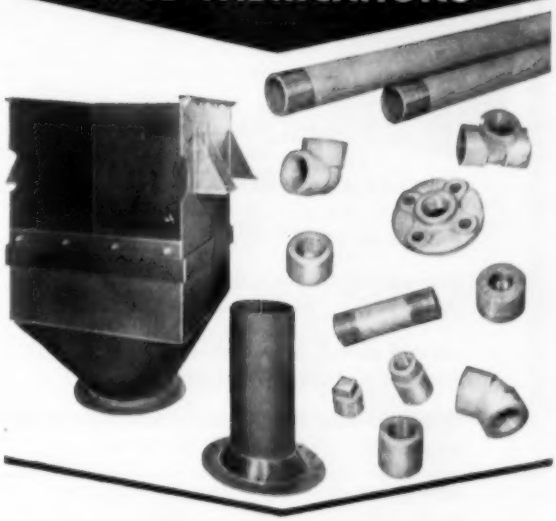
3143 BELLEVUE AVE.
DETROIT 7, MICHIGAN

USE READER SERVICE CARD; INDICATE B 629.

STOP *Corrosion with . . .*

Van-Cor

PLASTIC PIPE, FITTINGS AND FABRICATIONS



★ ***Both Chemically Resistant and Impact Resistant Types***

★ ***Half the Weight of Aluminum, with High Tensile Strength***

★ ***Readily Formed, Machined, Drawn, Molded or Welded***

AVAILABLE FORMS

SHEETS . . . 1/32" through 1". PIPE . . . ½" through 8" diameter (10 or 20 ft. lengths). ROUND BARS . . . ⅜" through 5" diameter (10 ft. lengths). WELDING ROD . . . ⅛" and 5/32" diameter.

TYPICAL APPLICATIONS

A rigid non-plasticized polyvinyl chloride, Van-Cor is fabricated into such products as: Ducts, Hoods, Chemical Tanks, Tank Liners, Plating Racks, Fume Stacks and Piping.

WRITE FOR ILLUSTRATED BULLETIN, SPECIFICATIONS, AND NAME OF NEAREST DISTRIBUTOR

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SUBSIDIARY OF THE VAN DORN IRON WORKS CO.
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USE READER SERVICE CARD; INDICATE B 630.

THE MORE KNOW-HOW YOU PUT IN THE BARREL, THE MORE PROFIT YOU TAKE OUT

Useful facts gathered during Oakite's years of experience in barrel finishing are packed like #12 stones in this 10-page booklet covering such subjects as:

PRECLEANING—Good tank cleaning; Good barrel cleaning; Good rinsing saves money.

CUTTING DOWN, DEBURRING—Good solutions; Abrasive media, water and work ratios, etc.

PICKLING, DESCALING, BRIGHT DIPPING—Good solutions for steel, brass, aluminum, etc.

BURNISHING—Good solutions; Burnishing media, water and work ratios, etc.; How to overcome water hardness; How to keep barrels and media clean; How to prevent rusting, tarnishing and other corrosion.

FREE For your copy of "*May I put my head in your finishing barrel?*" just write or mail the coupon.

Technical Service Representatives in Principal Cities of U. S. and Canada

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

OAKITE PRODUCTS, INC.
40 Rector St., New York 6, N. Y.

Send me a **FREE** copy of your booklet on Barrel Finishing.

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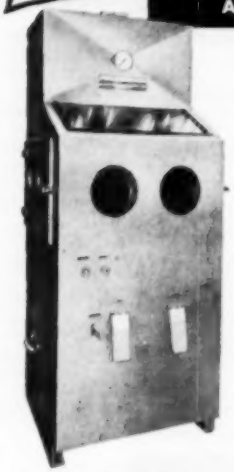
PRESSURE-BLAST
TWO SPEED **WET-BLASTING**

A New Metal Finishing Tool



- Hone Cutting Tools Between Grinds and After Sharpening for Longer Work Life.
- Deburr Intricate Spirals, Recesses, Slots and Holes.
- Polish and Maintain Plastic, Rubber and Glass Molds.
- Remove Tough Heat Treat Scale.
- Reduce Finishing Time on Drawing, Forging, Die Casting Dies, etc.
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- Eliminate High Cost Wire Brushing Operations.
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See Pressure Blast in Operation . . . at the Show . . . Booth 496

the **Cro-plate** company incorporated
Hartford 1, Conn.

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Job-fitted to cut your costs

Edmont
JOB-FITTED
GLOVES

Case No. 207: Handling sharp-edged metal products in hot plating solution . . . Job-fitted gloves reduced hand injuries 78%. Saved 6c per man-hour on cost of glove replacements.

Edmont's laboratories have developed and test-rated 34 types of coated work gloves to fit different job conditions. Send brief description of your operation. We will recommend and furnish test samples of the correct glove and name of nearby industrial supplier.

Edmont Manufacturing Company
1250 Walnut Street, Coshocton, Ohio
Largest maker of coated fabric gloves

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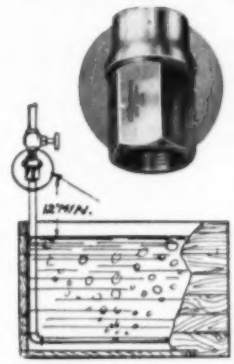
Save Water
Prevent Siphonage
Agitate Water
with
CADWELL #115
SIPHON BREAKER
AND AGITATOR

SAVE WATER



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THE BEATON & CADWELL MFG. CO.
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It's Good Business
and
It's Good Finishing
To Use
SEELEY BUFFING COMPOUNDS

Bar — Liquid
Greaseless

E. E. SEELEY COMPANY, INC.
Buffing Compounds
Bridgeport 1, Conn.

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FOR SALE

Slightly Used BUFFS

Loose and Sewed
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Any Quantity

MICHIGAN BUFF CO., INC.
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USE READER SERVICE CARD; INDICATE B 635.

"PAID FOR ITSELF"

"The course has paid for itself three times over just by putting some of your suggestions into practice." Joe Holody, Plating Foreman, 52 Surrey St., Guelph, Canada. It will pay you to investigate this outstanding, easy to take home study course in modern electroplating! No obligation of course. Write Joseph B. Kushner, Electroplating School, 115 Broad St., Stroudsburg 6P, Penna.

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Zialite
Reg. U. S. Pat. Off.
for NICKEL PLATING
The one bath especially designed for plating DIRECTLY on ZINC, LEAD, ALUMINUM, BRASS, COPPER and IRON.
for HARD CHROMIUM
USE Zialite ADDITION AGENTS
Harder deposits. Increased throwing power. Less sensitivity to sulfate content. Exceptionally fine results plating anything calling for Decorative or Hard Chrome.
ZIALITE CORPORATION
92 Grove Street Worcester 5, Mass.

USE READER SERVICE CARD; INDICATE B 636.

MODERN CONVEYORIZED WASHER BARGAINS!

Type of Conveyor	Stages	Opening Size
TROLLEY	wash, rinse, dry	18" w, 24" h
MESH BELT	wash	30" w, 5" h
SLAT TYPE	wash	30" w, 18" h
TROLLEY	wash & rinse	48" w, 48" h

Also automatic plating systems, rectifiers, motor generators, polishing machines and heat treating equipment.

Arrangements can be made to rent, lease or sell on terms.

METAL TREATING EQUIPMENT EXCHANGE
9825 Greeley, Detroit 11, Michigan
TOwnsend 8-8450—Please call "COLLECT"

USE READER SERVICE CARD; INDICATE B 639.

Branch News

BOSTON

Technical Meeting

On April 30 the 19th Annual Technical Meeting and Banquet was held at the Hotel Statler. The Technical Session was introduced by the Chairman, **Jack Wright,** and started at 1:30 P.M. with a talk by **F. P. Spruance, Jr.** of the Metal Working Chemical Division of the American Chemical Paint Company, Ambler, Pa. This talk was on "Chemical Treatment of Aluminum Surfaces for Corrosion Resistances and Paint Bonding."

Following his talk was one on "Magnesium Finishing" by **C. E. Kimmel** of the Magnesium Department of the Dow Chemical Company. The last paper for the afternoon was given by **R. E. Hafer** of the Application Engineering Department of the Reynolds Metals Company.

In the evening, the banquet was held in the Imperial Ballroom of the Statler.

One person who was missed at the affair was Dr. **George Swift,** who was confined to the hospital with a touch of virus.

L. to r.: C. E. Kimmel, Sales Eng., Dow Chem.; Jack Wright, Ch., Tech. Session; R. E. Hafer, Finishing Eng., Reynolds Metals

BRIDGEPORT

Candidates, Elections, New Officers

The regularly scheduled meeting of the Bridgeport branch AES was held in the Main Ballroom of the Hotel Barnum on Friday, April 8.

President **Philo Bailin** called the meeting to order at 8:15 P.M. with 28 members present.

The following were accepted as active members: **Lawrence A. French, Harry Simon, Paul Iannucci, Albin Jocis, Frank Hightower, William Popp.**

All plans had been finalized for the Spring dinner dance.

The following members were elected to the designated offices of the branch for the fiscal year April 1, 1955 to April 1, 1956: President, **J. Simon;** 1st Vice-President, **Robert Bonazzo;** 2nd Vice-President, **F. Tatum;** Secretary and Treasurer, **R. Parker;** Librarian, **M. Tamas;** Sergeant-at-Arms, **A. Ferguson;** Board of Managers, **William Ehrencrona, Anthony Chenis, Herman Braun.** Delegates to the Convention: **George Eckholm; Henry Maskowski, Carl Schaefer.** Alternate Delegates to the Convention: **Robert Bonazzo, William Ehrencrona, Joe Simon.**

After the installation of **Joe Simon** as President of the branch, the President's first act was to present the Past President with a Past President's Pin. **Anthony Chenis** was presented one belatedly.

The secretary was instructed to insure the issuance of copies of the National Constitution and By-Laws to each member.

A plant visitation to Avco is being arranged, and it was hoped that this would be accomplished by the September meeting.

Librarian **F. Tatum** introduced **J. W. Hensley,** manager of Nucleonics Laboratory Research and Development Division of Wyandotte Chemicals Corp. Hensley, by use of slides and an effective presentation, described the research in progress involving the use of radioactive tracers in various fields of detergency.

George Haas of Wyandotte Chemicals Corp. was host for the evening.

BOB PARKER,
Secretary

BUFFALO

A. A. Janis Elected Branch President

On Friday, April 1, **Clifford Struyck** of the General Chemical Division, Allied Chemical & Dye Corporation discussed the applications of fluoboric acid and fluoborate plating solutions in the plating industry.

Announcement was made of the branch picnic on July 30 at the Kendall Club grounds on Chautauqua Lake, N. Y. Tickets for the event are ready and may be secured from branch members.

The following were admitted to membership: **Wallace C. L. Rosdahl, Wilber C. Fullerton, J. Raymond Kilroy, Fred O. Goeckel, Wallace A. Keefe, Donald R. Pembridge, Harry W. Critzer.**

The following were elected to office for 1955–1956: President, **A. A. Janis;** 1st Vice-President, **R. F. Hofmann;** 2nd Vice-President, **B. B. Joffe;** 3rd Vice-President, **H. Fudeman;** Secretary, **E. G. Sampson;** Treasurer, **R. E. Campbell;** Librarian, **F. Rudolph;** Sergeant-at-Arms, **W. Hart.**

Board of Managers: **J. A. Moneypenny, L. A. Davis,** and **H. A. Day.** Delegates to 1956 Convention: **J. A. Moneypenny, S. T. Bush,** and **J. Ruft.** Alternates: **W. M. Fotheringham, H. A. Day,** and **L. A. Davis.**

ERIC G. SAMPSON, JR.
Secretary

CAPITOL DISTRICT

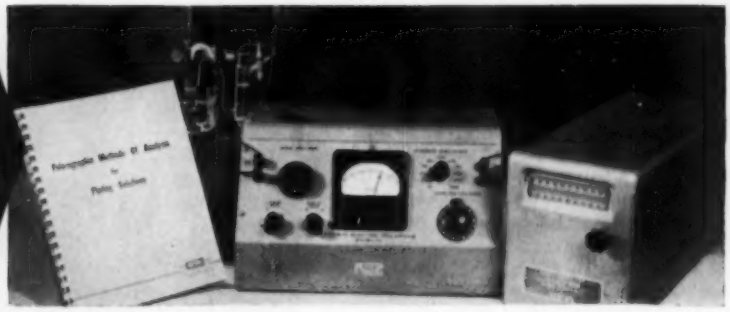
Branch Gets Permanent Charter

More than 50 members and friends turned out to take part in Charter Night of the Capitol District branch on May 2 at Latham's Circle Inn. AES Executive Secretary **Peter Kovatis** presented the Permanent Charter on behalf of the Executive Board, substituting for **Dr. George P. Swift,** AES Past President who was unable to be present because of illness.

The evening's program also included an interesting talk on "Advances in Hard Chrome Plating" by **Meyer Shacat** of United Chromium, Inc.

Happy to receive Capital District branch Permanent Charter from Executive Secretary P. Kovatis, extreme right, are branch Past President Ted Infield, right, and President Paul D. Callahan

WE CUT OUR OWN ANALYSIS TIME BY MORE THAN 50% WITH THE C-1 ELECTRO-POLARIZER



We do a great deal of electro-plating at the Patent Button Company—not only on our own products, but also on contracts for many other firms—much of it to strict Government specifications. We plate with copper and zinc cyanide, cadmium, brass and nickel solutions.

Analyses in 20 Minutes!

Before we developed the Patwin C-1 Electro-Polarizer, we spent an average of 60 minutes in analyzing a typical solution by chemical methods. Now, with this instrument, analyses of very high accuracy are completed in 15-20 minutes! Our production has been speeded considerably, and we want to pass the news along to other electro-platers facing the same problem.

Top Quality! Low Cost!

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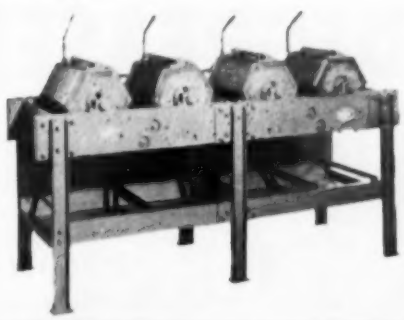

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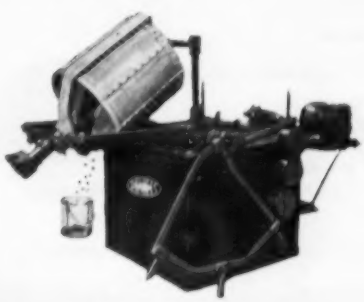

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Branch News

In presenting the charter to the branch, Kovatis paid tribute to **Lindley Wood** and **Ed Hollister** of the Syracuse branch, to **Ted Duval, Ted Infield, Paul Callahan, Norm Searles** and to **Jim Stevens** for their efforts in organizing the Capitol District branch. Kovatis also presented gavels on behalf of the branch to past president **Ted Infield** and to **Paul Callahan,** present branch leader. The national secretary also talked briefly on the various research projects being sponsored by the Society. He urged members to submit articles and papers to PLATING and he cited the alarmingly small backlog of articles for the journal. "It is hard to understand how a Society like ours—with a membership close to 7,000—cannot muster up 36 articles a year for PLATING. We can and will make PLATING the leading magazine in our field, but we need your help," Kovatis emphasized.

A business meeting followed the main program.

Members who made possible the formation of the Capital District branch. L. to r.: Ted Duval, Jim Stevens, Ed Hollister (Syracuse), President Paul Callahan, Past President Ted Infield and Norman Searles. Another member who was chiefly responsible for the formation of the Capital District branch who was absent when the photo was taken is Lindley S. Wood of the Syracuse branch

CENTRAL MICHIGAN

New Board Elected

The annual business meeting and election of officers of the Central Michigan branch was held at the Porter Hotel in Lansing, Mich., on April 12.

The first item of business was the election of a new Board of Directors comprised of eight members. Those members elected to this board are as follows: **E. J. Bosca, R. L. Carter, William Mogle, F. Young, F. Stuckenburg, L. Reiman, G. Woodruff,** and **R. W. Boos.**

The new Board of Directors elected the following officers for 1955–56: President, **R. L. Carter;** 1st Vice-President, **F. Young;** 2nd Vice-President, **L. Reiman;** 3rd Vice-President, **R. W. Boos;** Secretary-Treasurer, **E. J. Bosca;** Librarian, **D. Trafelet;** Research Chairman, **F. Gurnham;** Publicity, **G. Woodruff.**

The following members were appointed delegates to the AES National Exposition in Cleveland: **F. Stuckenburg, U. Forsyth,** and **H. Marsh.** Alternates appointed are **William Mogle, E. Bosca,** and **R. W. Boos.**

Additional plans were discussed and

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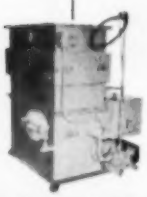

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Branch News

made concerning the exhibit for the National Exposition, it being decided to assemble all exhibit parts at the May meeting to be held in Jackson, Mich.

Through the courtesy of Eastern Air Lines a movie entitled "Flying with Godfrey" was shown.

The Central Michigan branch, AES, wishes to extend its sincere appreciation to the Carrier-Stevens Company who were sponsors of the meeting.

R. W. Boos,
Publicity

CHICAGO

Pleva on "Educated" Paint

Friday the 13th did not dampen enthusiasm for members of Chicago branch, during their May meeting in the club rooms of the Western Society of Engineers. The meeting was well attended and the speaker of the evening, **Milton Pleva,** sales engineer for the Ransburg Electro-coating Corporation, was well received. Pleva presented a very interesting sound-movie on "Electrostatic Spraying."

Many of us have watched with wonder the movement of globules of paint as they ran around corners; starting out from a spray gun in one direction and suddenly changing course to strike an object for which they were intended but at which they had not been aimed. This interesting subject was illustrated in the film, showing the development and applications of Ransburg's No. 1 and No. 2 Electro-static spray processes. The applications include the use of reciprocating heads for conveyorized handling of automobile bodies. Attention was given to "detearing." Following the showing of the film, Pleva, who covers the Chicago area for Ransburg, answered questions.

During the question period which immediately precedes the general meeting, a panel of experts consisting of: **Gene Gryglas** (Cinch Mfg. Co.), **Klem Petrosius** (Superior Plating Works), and **Herman Miller** (Automatic Electric Co.) answered questions on the current problems experienced by various branch members. These question periods are always helpful, not only to the member who asks the question but to others who have had similar problems.

Other activities of the branch include a meeting of the librarian's committee, consisting of **Russ Harr,** Chairman; **R. Scott Modjeska, Don Chiz** and **Matt Dassinger** at which a program for the coming year was outlined and should be ready for publication by their next meeting. Advance programming enables members to plan ahead for the "MUSTS."

Ladies' night, April 1, at Algauer's, brought out 210 members and their ladies. The film after the meal was well photographed and equally well received. Winners in a drawing for the ladies' prizes were: Dresser Set, **Josephine Petrosius;** Compact, **Rita Gardino;** Compact and Lipstick, **Clara Garman;** Compact, **Irene Modjeska;** Compact, **Mrs. Walter Schmidt.**

Marion Longfield installed the officers for the coming year and his wife, Marian, was wished a "HAPPY BIRTHDAY" in song by the assemblage.

At a meeting in the offices of the Chicago Electroplaters' Institute, the subject of a research program on buffing was discussed. If members of any other branches have ideas on this subject to present they will be welcomed.

Jerome Kuderna,
Publicity Chairman

CINCINNATI

Rarick President for '55-'56

Thirty-eight members and guests were called to order on April 27 by president **Bill Gordon.**

Bill immediately turned the meeting over to librarian **Will Loveless,** who introduced the speaker for the evening, **Myron Ceresa,** of Westinghouse Electric Corp., Pittsburgh, Pa. Ceresa covered the topic of "PR Cyanide Copper Plating," outlining its advantages, necessary equipment and materials, types of baths available, solution operation and control, common troubles with their correction. It was an interesting and thorough presentation.

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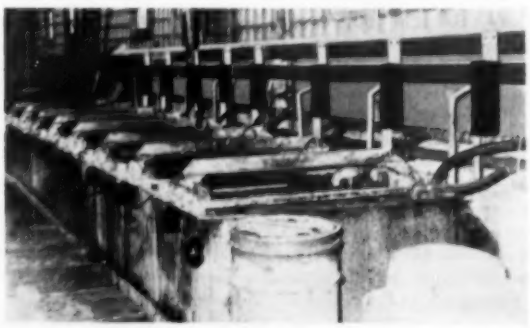

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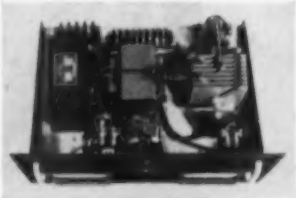

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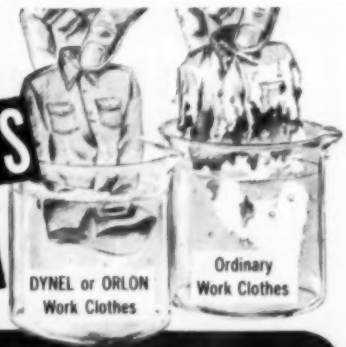

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Branch News

Our business meeting was then opened. **Ed Roof** presented the revised By-Laws and Constitution of the Cincinnati branch for discussion and approval by the membership. Ed pointed out the few changes which had been made in the original by-laws, and the fact that there were few questions or objections testifies to the thoroughness of his committee's preparation. **Robert Miller** moved that the by-laws be accepted as outlined by the committee and the motion was carried by the membership.

Changes in our delegates to the national convention in June 1955, were then announced by President Gordon, with our new slate of delegates as follows: Delegates: **Bill Young, Robert Rarick, Bill Stephenson.** Alternates: **Russ Waters, Bob Miller, Chuck Wise, Bill Gordon.**

The application for admission of **E. H. Maus** was presented to the membership, and they indicated their approval.

Evan Foertmeyer started off the June picnic with a bang, and it appears that this will be a bigger and better picnic than we have had for some time. The committee has gone to some effort to stir up enthusiasm for this picnic, setting up prizes, etc., to be held on June 4 at Clearview Park.

Will Loveless then announced plans for the May meeting. This is to be a plant visitation at the Electric Autolite Bumper Plant in Sharonville, Ohio.

The annual election of officers was the next item on the business docket. **Bob Miller,** Chairman of our Nominating Committee, presented a slate of candidates for the various offices. President Gordon asked for further nominations from the floor, and there were none. Since there was no competition for the offices, it was moved and passed that their election be considered unanimous. Balloting was then begun for the remaining offices, with the following result: President, **Robert K. Rarick;** 1st Vice-President, **Edwin Roof;** 2nd Vice-President, **W. Wilson Loveless;** Librarian, **C. E. Foertmeyer;** Secretary, **Richard K. Evans;** and Treasurer, **Gordon T. Speers.**

The gavel was then turned over by ex-president Bill Gordon to our new president, Bob Rarick.

Ceresa took occasion to ask our support for the Pittsburgh branch in their attempt to capture the national convention in 1960.

Following this business meeting, our social hour was sponsored by Diamond-Alkali Company.

L. J. Howald,
Secretary

CLEVELAND

Lupien President in Cleveland

The April meeting of the Cleveland branch was held on April 1, at the Carter Hotel.

The meeting was called to order by President **Henry Friedberg,** who immediately turned the meeting over to Librarian **Ed. Roehl,** who introduced **William J. Neill,** Past President of our National Society. Neill, who is general manager of the Columbus Metal Products Company, was the speaker for the evening, and his subject was "Copper-Tin Alloy Plating."

Neill, who addressed an audience of approximately 60 people, was especially interesting with a very thorough discussion of the practical aspects of Copper-Tin Alloy Plating. The origin of this type of plating was evolved through the joint research work of The Battelle Institute, Dennison Engineering and Columbus Metal Products. The latter company was responsible for perfecting the commercial application of this specialized alloy plate and our audience received first hand knowledge of its advantages in a number of specific applications.

Following Neill's excellent presentation, **Bill Scott** honored the branch with his usual good techniques of installing the new officers of the 1955–56 season. As reported in the last issue of Plating

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Branch News

these officers were **A. J. Lupien,** President; **A. H. Du Rose,** 1st Vice-President; **E. T. Rollel,** 2nd Vice-President; **R. I. Peters,** Secretary and Treasurer; **M. Van Loan, Jr.,** Librarian; and **J. B. Winters,** Asst. Librarian in absentia.

Cochairman of the National Annual Convention to be held in Cleveland this June, **Gene Combs,** gave a short but concise report on the excellent progress of all committees up to date, and we have every assurance that this coming convention will be one of the best.

Through the courtesy of the Hanson-Van Winkle-Munning Company, refreshments were served directly after the meeting.

M. Van Loan, Jr.,
Assistant Librarian

DALLAS-FORT WORTH

Slate Elected Unanimously

The March meeting of the Dallas-Fort Worth branch was held at the Lennox Hotel, Grand Prairie, Tex. The President, **Bob Miller,** led the business meeting in such matters as: Appointment of delegates to the National Convention, the Report of the Nominating Committee, in which the following men were candidates for office during the coming year: President, **R. H. Heppel;** 1st Vice-President, **K. W. Kirsten;** 2nd Vice-President, **Glen Monroe;** Secretary-Treasurer, **A. C. Fricke;** Librarian, **Victor Baltzell.** This slate of officers was unanimously elected.

The speaker for the evening was **Walter Warner** of the Kocour Company, Chicago, Ill. He gave us very interesting and useful information on "Analysis of Plating Solutions" and a very practical demonstration of the new electronic thickness tester.

R. H. Heppel,
Secretary

DAYTON

William Hartzell Dead

The regular April meeting opened with a dinner at Pappy's Kitchen Klub with 31 members present. Chairman **John Easton** announced the appointment of **Frank Klein** as chairman, **Fred Bauch** and **Julius Teres** as the nominating committee for the elections next month.

The technical program got underway at 8:00 with the introduction of **Byron Bowman,** a Dayton branch member, with the Aeroproducts Div., GMC who presented a short discussion on "Carbonate Removal from Cyanide Plating Solutions."

Librarian **Holle Leuchauer** next introduced **H. Castle,** vice-president and technical director of the Roto-Finish Co. of Kalamazoo, Mich. His topic was "Fixture Machining." He discussed the development of Roto-Finishing and explained the principles involved. By the aid of numerous slides he was able to show the equipment used and applications to various precision parts. The interest in the subject was shown by the numerous questions asked.

After the meeting we were treated to refreshments also through the courtesy of the Roto-Finish Co. and their local representative and Dayton branch member, **Richard McDowell** of Dayton.

R. M. Clinehens,
Secretary

We were sorrowed by the recent death of one of our most esteemed members, **William Hartzell.** Hartzell had been a member of the Dayton branch for the past 40 years having joined when he was a plating foreman with the Crown Hardware Co. For the past number of years, Hartzell was the owner of the Dayton Rustproofing Co. of 1030 Valley St., Dayton.

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Branch News

GRAND RAPIDS

New Officers Installed

The April meeting was attended by 30 members. President **Carl Green** opened the business meeting by greeting all members and extending a special greeting to **Henriette Fikse,** the only lady attending. Secretary **John Dykstra** read the minutes of the previous meeting. President Green gave the annual report covering membership, and the financial condition of the branch. He then proceeded to introduce the incoming new officers for the 1955–56 fiscal year. The new slate of officers are as follows: **Perry Burnham,** President; **Bob Blackford,** 1st Vice-President; **Tom Henner,** 2nd Vice-President; **Don Smith,** Secretary; **Pat Norton,** Treasurer; **John Dykstra,** Librarian; **Paul Waalkes,** Assistant Librarian. The members of the Board of Managers are **Carl Green,** as past president, **Jack Hanney,** and **Lyman Sperry.**

President elect Perry Burnham then took over the meeting and presented Carl Green with the Past President's Pin.

L. E. Cole was elected to membership and **Chet Borlet** was transferred into our branch. John Dykstra, our new librarian, introduced the speaker for the evening, **John A. Swift,** president and technical director of Swift Industrial Chemical Company, Canton, Conn. Swift's subject was "What the Plater Should Know About Metallurgy." His talk covered the manufacture of steel, the elements that are added and their function.

The regular social hour followed Swift's talk.

MATT MITCHELL AND
KENNETH HAMPEL

HARTFORD

Officers Installed

The regular branch meeting was held at the Bond Hotel on April 18 and about 54 members and guests were present. Preceding the meeting a colored movie entitled "The Bull Dog" was shown.

The guest speaker for the evening was **Cleve Nixon,** head, Electro-Chemistry Dept., Research Laboratories Division, General Motors Corp., whose subject was "Plating for Out-of-Door Durability."

Nixon pointed out that automobile parts are plated for the improvement of appearance and for corrosion protection. Then by means of slides Nixon gave facts and figures of a recent car survey covering the country on how well the plated parts were standing up under different weather conditions. Factors affecting data were thickness of plate and whether all nickel or copper and nickel were used under the chromium. However, no definite conclusions have been reached as yet as to which is superior from a corrosion standpoint.

Art Logozzo was technical chairman for the evening.

After a brief introduction by Arthur Logozzo the following members were installed for the coming year: President, **Joseph McInerney;** 1st Vice-President, **George Colombic;** 2nd Vice-President, **Stuart Begg;** Secretary, **Stanley Platoz;** Treasurer, **Bernard Cohen;** Educational Advisor, **Ralph Chase.** Educational Committee: **Armand Faucher,** chairman; **Arnold Johnson,** and **Walter Acker.** Board of Managers: **Eugene Dowling, Julia Madzik,** and **Ralph McCahan.**

HOUSTON

New Officers Installed

The April meeting was held at the Ben Milam Hotel on April 19, with ten members and two guests present. Membership Badges were distributed to all members present.

Newly elected officers were installed: President, **H. L. Mauzy;** 1st Vice-President, **Harold Hill;** 2nd Vice-President, **Jasper Dee;** Secretary-Treasurer, **H. C. Van Wagner;** Librarian, **E. A. Schumacher.**

Two new members, **Wayne H. Waters** and **Ralph A. Marz,** were welcomed into the branch.

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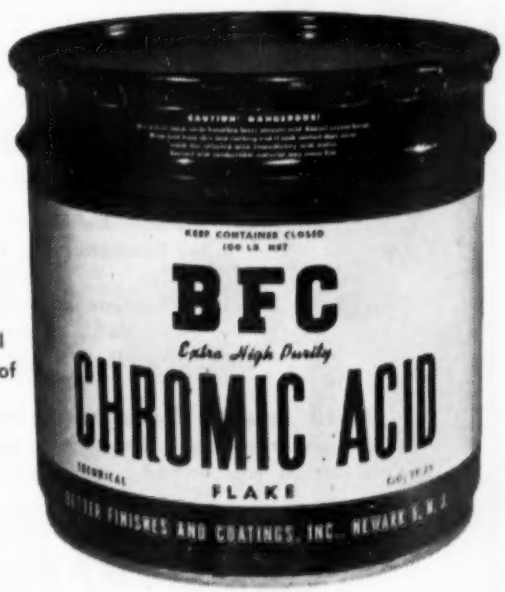

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Branch News

Jr. was presented with a Past-President's Pin.

Louis J. Schustik of du Pont Electrochemicals Division presented an interesting discussion on cyanide zinc plating and showed color slides of various plating shops.

INDIANAPOLIS

Branch Reps Named

The April 6 meeting was well attended with 37 members present for dinner and meeting.

The president, **Elmer Lundberg,** announced that **Herb Kennedy** and **Frank Hartwig** will be the branch representatives on the Tri-State Regional committee. Kennedy said Hartwig was appointed the secretary of the group for this coming year. The next committee meeting of the group will be held at the Cleveland convention. The 1956 Tri-State meeting will be in Dayton, Ohio, on March 10. The 1957 meeting will be in Indianapolis.

Reports followed on our April 23 annual educational session and dinner dance. Deadline for tickets is April 20 and **Les Reynolds** said either tickets be returned on that date or pay for same. The program and entertainment chairman reported everything ready.

Frederick Anderson reported on the TV script and it was decided to table this for the time being.

One new member was voted into the society in a motion by Reynolds and seconded by **Jack Vaughan.** He was **Fred L. Brower** of Guide Lamp in Anderson, who resides at 625 Washington Court, Anderson. The motion was carried.

Ed Bruck announced that the Indianapolis invitation for an Interim meeting is still acceptable by the national officers.

Reynolds suggested that the delegates take a stand on the candidate to back for the coming election. The president asked that this be continued at the May meeting.

Two members, **Al Kriese** and **Francis Thomason** were reported ill and cards are to be sent to them by the secretary.

The program was to be a panel discussion by three of our members who are **John Holland, John Hood** and **Mrs. Jeanetta Peacock.** As Hood could not attend, this was carried on by the other two members. The subject was "Testing Plates and Plating."

EDNA ROHRABAUGH,
Secretary

LOUISVILLE

Candidates Named for '55-'56

The regular monthly meeting of the Louisville branch, AES, was held Thursday, March 17, at Kapfhammer's Party House, Louisville, with a dinner served at 6:30 P.M. President **J. W. Scholl** opened the business and open meeting, with 22 members and guests present.

Reports of special committees:

William W. Francis, Chairman of the Exhibit Committee, reported that the committee and members decided not to contribute to the Exhibit for the AES National Convention to be held in Cleveland, June 20, this year.

Arthur A. Oertel reported that he was unable to attend the Tri-State Regional Meeting as a delegate at this time. **James R. Smith** was appointed to substitute for Arthur A. Oertel as a delegate to the Tri-State Regional Meeting at Columbus, Ohio.

Arthur A. Oertel reported that progress was being made on the Membership Roster and will make a further report at the April meeting.

Stanley J. Beyer, Chairman of the Nominating Committee, reported the following as candidates for office for the new fiscal year, April 1, 1955, to April 1, 1956: President, **William W. Francis;** 1st Vice-President, **Kenneth C. Reifsteck;** 2nd Vice-President, **Stanley J. Beyer;** Secre-

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Branch News

tary and Treasurer, **Joseph G. Sterling;** Librarian, **John S. Houston;** Sergeant-at-Arms, **John Kehrer.** A call was made for nominations from the floor and none were received. It was moved and seconded that the nominations stand approved.

The Membership Committee reported two applications for membership. The Sick Committee reported no illness in the membership at this time.

Technical Sessions Chairman **S. J. Beyer** reported that **J. D. Little,** McGean Chemical Company of Cleveland, Ohio, will speak on "Trouble Shooting in Nickel Plating" at the April meeting.

Bill Young, of the Cincinnati branch AES, gave us a report of the Annual Tri-State Regional Meeting which was held on Saturday, March 26, at the Hotel Deshler Hilton, in Columbus, Ohio.

Millard E. Vowels was reinstated as a member of good standing.

The meeting was then turned over to the Librarian, **Stanley J. Beyer,** who introduced the speaker, **D. S. Roland** of the Sarco Company, Inc., New York, who gave us an excellent down to earth talk on "Temperature Control of Electroplating Processes."

D. S. Roland's talk was mostly on the types of automatic temperature control of solutions by using heating and thermocouple devices operated by hot, steam, and electricity.

WILLIAM W. FRANCIS,
Acting Secretary

MELBOURNE

Aussie AES-ers Hold 93rd Session

The 93rd regular meeting opened at 8:10 P.M., after a showing of films, with 62 members and visitors present. President **Tikotin** was in the chair and minutes of the previous regular meeting (November) were read and confirmed on the motion of **Morgan,** seconded by **Manderson.**

Three new members were admitted on the motion of **Fanner,** seconded by **Mann;** they were **W. Coker, D. D. Forbes** and **N. M. Tucker.** The chairman urged members to bring along their friends in the industry to meetings and get them to join the branch.

A Past President's badge was presented to **J. Parker** by the chairman who thanked him for his efforts in the previous year.

The speaker for the evening, **Don Isaacs** of Sydney, was introduced by **G. Walker.** Isaacs gave a very interesting talk on "Practical Experiences with Hard Chromium Plating," illustrating many of his points with plated parts which were passed round the audience. He recommended a bath containing 33 oz/gal chromic acid with a sulfate ratio of 100. Under today's conditions a high standard of job is required with sizes at least as close as one thousandth, there should be no burning, edge build up, or other defects. To do this needs very careful preparation of the job, the anodes and the jig.

Among the many types of job done were aluminum cylinder liners, plated after a nickel chloride dip, printing plates for cigarette cartons and a large cast-iron drum with a surface area of 33 sq ft. The speaker gave a great many practical hints on this rather difficult type of plating. At the conclusion of his address a vote of thanks to the speaker was proposed by **Kevin Howard** and carried with great acclamation.

B. D. REABURN,
Secretary-Treasurer

MILWAUKEE

New Sustaining Member

The regular April meeting was held at the Ambassador Hotel on Friday, April 1. The secretary-treasurer read the minutes of the February and March meeting and the 50 members present approved them as read. Five applicants were accepted as new members and then the president welcomed these people to the society.

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Branch News

The research committee announced that they had obtained another sustaining membership from the Allis Chalmers Co. Delegates to the Cleveland meeting were appointed and are: **Henry Bornitzke, Phil Ritzenthaler, Les Biveley, Glen Schwemer,** Alternates: **Robt. Steuernagel; Frank Marshall.** The Delegates were instructed to back **Duke Wysong** for the office of 3rd Vice-President of the National Society.

The speaker for the evening was **C. E. Kimmel** for Dow Chem. Co. He presented a very informative lecture on the various finishes for magnesium, both chemical and electrochemical. Samples of the numerous finishes were exhibited for inspection of the members.

Two door prizes were donated, one by the John Oster Mfg. Co. and one by the Belke Co.

C. Peter,
Secretary-Treasurer

MILWAUKEE
Annual Meeting

The Milwaukee Annual Meeting was dotted with surprises and pleasantly planned events. The Educational Session started by Ed Robinson, the chairman, yielding to AES Past President W. J Neill. Having taken over as Honorary Chairman, Neill proceeded to give a report on some aspects of the great accomplishments of ORSANCO. Neill has served on the Ohio River Sanitation Commission for some years.

PARTICIPANTS in Milwaukee Annual Meeting. Left to right: Arthur Linn, Librarian; President Glenn Schwemer; AES Past President W. J. Neill, Honorary Chairman; Ed Robinson, Chairman; AES President R. A. Schaefer, speaker; Theodore F. Wisniewski, speaker; and Dr. Edward B. Tooper, speaker

Since the Educational Session dealt primarily with water purification, water treatment, and waste disposal, this was a fine start. Then T. F. Wisniewski read a paper on the efforts of Wisconsin's State government to clean up the streams and maintain clean waters. His talk covered

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Branch News

some of the legal aspects as well as the technical sides of the problems they encounter. Dr. E. B. Tooper delivered a talk on ionizing resins and their uses in the softening of water. This talk brought the focus of attention to water at the user's level and tended to awaken an awareness of the great economies and finer work which can be accomplished with soft clean water.

Finally, Dr. R. A. Schaefer, AES President, gave a talk on microscopic studies of electrodepositions. This paper deals with the most technical aspects of plating and has a tendency to demand the whole attention of the audience. The result is that so much knowledge and information is concentrated in so tight a period of time that much of the information must be lost. It cannot be said that this is in any way traceable to a lack of illustration since Dr. Schaefer has many colored slides to illustrate what he's saying. It's just too much information for one sitting.

The afternoon was passed in visiting and learning (after a beautiful lunch in the fine coffee shop of the hotel). Then, the piece de resistance, the banquet and show of the evening. Here was brought together fine company, fine food, and excellent entertainment. Milwaukee must be commended for the taste, hospitality, graciousness, and good fellowship that pervaded the entire Annual Meeting.

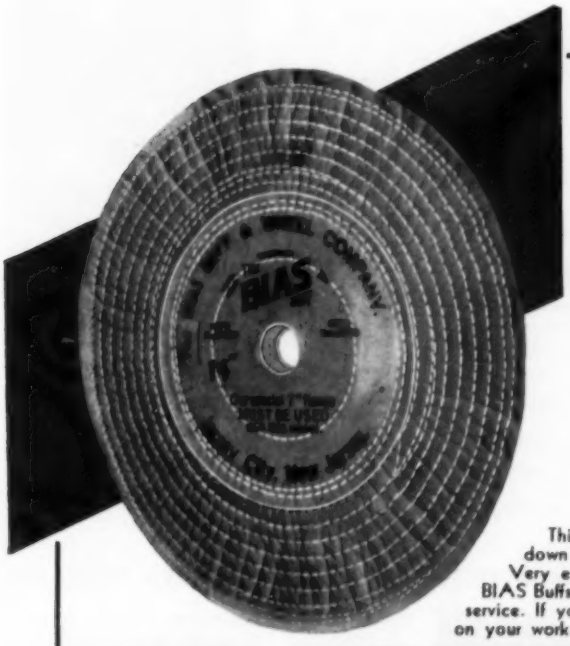
MILWAUKEE branch president Glenn Schwemer (right) points with pride to growing list of Sustaining Members credited to his branch. Ed Robinson, perennial annual meeting chairman, looks on

NEWARK

Platinum Metals, Silver Discussed

Following the customarily well attended Dutch Treat at the Robert Treat and a film depicting automatic barrel plating by an F. B. Stevens automatic line, the April 15 meeting of the Newark branch was called to order by President **Austin. Danile Marino** of Keuffel and Esser and **James J. Shyne** of Vitro Laboratories were elected to membership and the applications of **William Ross** of Bart-Messing Co., **Charles Smith** and **Albert Nortoff** of Hanson-Van Winkle-Munning Co. were accepted.

Past Presidents' Pins were presented to **Louis Donroe, George Klink, Robert Sizelove** and **George Wagner** who were absent from the March meeting, by **Edward Faint,** a charter member of the Society. The Board of Managers was appointed by President Austin to audit the books for the year 1954-1955. The meeting was then turned over to Librarian **Gustav Bittrich** who introduced **Dr. Karl Schumpelt** of Forstner Chain Company who selected as his timely topic recent developments in precious metal plating. He pointed out that there has been little real development in recent years. Silver plating from bright baths was claimed to lack the jewelers finish and warmth required by the trade, while being at the same time harder and more difficult to buff. In the field of gold plating, the speaker claimed a normal gold solution yields sufficiently bright deposits and that at least one new bright gold process is sufficiently bright to eliminate all post



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Branch News

plating processing. New alloy baths are available, but because of legal complications the market will not be too good. Alloy deposits may still fail to give uniform color over a wide range. In the field of platinum metals little work has been done. Rhodium plating is still done as heretofore. Platinum finds few users with the platinum diammino nitrite being used now. Palladium is less used than ever, but there is some new interest and the palladium chloride-sodium nitrite bath is the one of most appeal. Ruthenium is being pushed again, the ruthenium nitrosochloride formula being used.

Barnet Ostrow of Lea-Ronal, Inc. then discussed "Bright Silver Plating." He reviewed the history of silver plating and pointed out that really bright processes were of recent origin. Ostrow pointed out the many possible organic impurities that may be elaborated in a silver bath and emphasized the need for carbon purification to remove these impurities. He also noted the need to oxidize sulfidic sulfur and that KIO_3 (patent application) was useful in removing this contamination. He discussed the advantages of the potassium formulation, claiming faster speed for the potassium bath and the possibility of roughness from the sodium bath as the result of carbonate build-up. Ostrow also discussed the deposition of heavy coatings of silver and the need for carbon treatment as well as the maintenance of the silver strike. He said both contained a short chain organic ring compound not susceptible to carbon removal and at times a wetting agent which is so removed and the sodium ion which has brightening effects.

The many questions posed after the meeting testified to the general interest of the group in the two talks.

D. Gardner Foulke

NEW YORK

Bennett Brooks on Tin

The meeting was held April 15 in the Hotel Statler, New York, and was called to order by **A. Fusco,** President.

The meeting was turned over to **E. Saubestre,** librarian, who in turn presented **Robert Gore** of Metal and Thermit Corp., who, assisted by **Bennett Brooks,** gave a talk entitled "Some Practical Aspects of Tin and Tin Alloy Plating." His talk, well illustrated with many slides, covered the plating of tin, tin-nickel, tin-zinc, and tin-copper. The value of alloy plating in producing coating of great variety of properties was stressed. Considerable discussion was given of the problem of handling anodes in tin and tin alloy baths. This discussion was highlighted by colored slides of the appearance of properly filmed anodes. There was a lively question and answer period, followed by the distribution of operating manuals covering all of the plating processes mentioned in the talk.

Lester Levinson,
Recording Secretary

PHILADELPHIA

Quaker City Platers Elect

The regular meeting was held at the Engineers' Club on March 25 and was attended by seventy. One active member was admitted and four applications received. Treasurer **George Long's** resignation due to reasons of health was read, also the final fiscal statement of the 1954 Banquet and Ed. Session, and the AES publicity release on the spreading rate of oils.

The election of officers for 1955–56 produced the following results: President, **William H. Trusdell;** 1st Vice-President, **Robert L. Farren, Jr.;** 2nd Vice-President, **James E. Cogan, Jr.;** Secretary, **I. Wm. Marcovitch;** Treasurer, **Paul Mentzer, Sr.;** Librarian, **C. Brooks Ricca;** Board of Managers: **Alfred H. Pope, Edwin F. Ottens, Ralph W. Wirt;** Delegates: **Samuel Heiman, I. Wm. Marcovitch, William H. Trusdell;** Alternates: **Frederick Fulforth, Alfred H. Pope, William H. Moyer.** The new officers were inducted by Supreme Past President Frederick Fulforth. A Past President's Pin was presented to **Ed.**

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Ottens by the newly elected Branch President Bill Trusdell. The gavel was turned over to Trusdell by Ottens.

The speaker was **William H. Jackson,** Udylite Corp., whose topic was "Barrel Plating." He discussed the trends to higher voltages (12 to 18 V) for zinc and cadmium; cooling with heat exchangers; Tempron hard rubber cylinders; automatic equipment; ventilation of tanks; automatic drying. Also discussed were many pertinent features of good barrel plating practice.

The following appointments were announced: Editor of the Reminder, **Eugene Winiarski;** Research Chairman and committee, **Herman Wright, Albert Butterer, William Moyer.** A motion was passed that a letter of appreciation be sent to **George Long.**

The regular meeting was held at the Engineers' Club on April 22, preceded by a dinner. Four active members were admitted—two applications were received. The budget committee was appointed; the secretary read announcements and communications. Enough interest was shown by those present to warrant arrangement of a trip to the Fairless Works at Morrisville in lieu of the June meeting.

John A. Swift, The Swift Industrial Chemical Co., was the speaker, his topic—"What the Plater Should Know About Metallurgy." He outlined the three methods of making steel—Bessemer, open hearth and electric furnace. He described killed, open and semi-killed steels and their uses and the methods of preparing ingots for further use: through bloom, billet, rods, strip, sheet, etc., hot and cold rolled. Swift explained the basic principles of heat treating and the effects on the surface condition of steel. To illustrate conditions that cause trouble in the finishing of steel, slides were shown. The slides also illustrated the several types of hardness testers: Rockwell, Brunel and micro-hardness. Quite illuminating were the slides of steel microstructures showing the changes with heat treating with no change in the chemistry of the steel.

I. Wm. Marcovitch,
Secretary

PORTLAND

Dr. Beckwith on Corrosion

Our regularly scheduled March meeting was held at the Campbell Court Hotel with 35 members and guests present. After our short business meeting, Portland group of the Quality Control joined us in hearing a talk by **Dr. M. M. Beckwith** of Harshaw Chemical Company, Cleveland. Dr. Beckwith spoke about corrosion, methods of testing plated parts, and some of the methods now used for predicting corrosion resistance of plated parts. This was one of our best meetings, and we would certainly look forward to having Dr. Beckwith speak to us again.

Ken Humphrey,
Secretary-Treasurer

ROCKFORD

New Officers Elected Unanimously

The regular meeting was held Monday evening, April 11, at the Faust Hotel with 24 present for dinner and 32 attended the meeting which followed.

A report from the chairman of the Annual Educational Session and banquet was read. The latter was a tremendous success.

The chairman of the nominating committee brought in a slate to be voted on for officers for the ensuing year. As no further nominations were made from the floor, a motion was made and seconded that the secretary cast a unanimous ballot for the slate recommended: **Wm. Foley,** President; **Le Roy Johnson,** 1st Vice-President; **Dave Stockton,** 2nd Vice-President; **E. J. Budden,** Secretary-Treasurer; **Lawrence Ray,** Librarian; **Elmer Johnson, Gust Lehman, Wm.**

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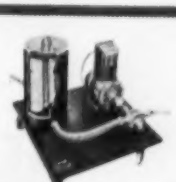

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Gritzmaker, Walter Fox, Board of Managers.

The meeting was turned over to **Lawrence Ray** who introduced **Vernon Sturm** of the Diversey Corp. who spoke on "The Preparation of Aluminum for Spot-Welding."

E. J. Budden,
Secretary

SAGINAW VALLEY

Robert Nyquist Installed

The Saginaw Valley branch held their monthly meeting at Zehnders in Frankenmuth on April 14. Sixty-seven members and guests were on hand to hear a talk by **R. W. Parker** of the State Water Resources Commission. His topic was "Stream Pollution."

Robert Nyquist, the newly elected president, was installed into office by **G. H. Carter,** the outgoing president.

A door prize consisting of a fishing reel and line was donated by **Stan Beauregard** of Hanson-Van Winkle-Munning Co. and won by **Robert Nyquist.**

Alfred Knight,
Recording Secretary

ST. JOSEPH VALLEY

Ladies Night a Success

The annual Ladies Night was held at the Hotel Elkhart, Elkhart, Ind., on April 13. Fifty-three members and their ladies attended the meeting.

Ray J. Dearth made all the arrangements and acted as master of ceremonies for the evening's entertainment. A social hour preceded the dinner. Favors for all the ladies present augmented the table decorations.

Our dinner guest was **R. Nelson Snider,** Principal of the South Side High School of Ft. Wayne, who delivered a humorous address on "The Anatomy of Humor." He traced "humor" from the very earliest of time to the present—with short descriptions of the types of humor, profusely illustrated by examples, which kept his audience chuckling all evening.

Door prizes were won by **"Duke" Wysong, Joe Curtis, Chester McDowell, Andy Jurgensen,** and **Larry Baker.**

Our president announced the resignation of **Don Kraft,** who had accepted a new job assignment in Chicago. Due to this, the office of 2nd Vice-President had to be filled and the following changes were effected: 2nd Vice-President, **Arthur G. Wiegand;** Librarian, **Ray J. Dearth;** Board of Managers, **Larry Baker.**

The last regular meeting of the St. Joseph Valley branch for this spring was held at the Hotel Elkhart, Elkhart, Ind., on May 4. Twenty-seven members and guests attended the dinner and twenty-nine were present for the technical session.

Our President, **John Bayman,** opened the meeting with a round of introductions. The April minutes were read and approved. The Secretary-Treasurer gave a membership status and financial report. **Dr. Harold Wiesner** reported on the Milwaukee meeting and the progress of "Duke's" candidacy. **Bill McDowell** reported on the Indianapolis meeting. Dr. Wiesner, who is on the Editorial Board, brought to our attention that articles and papers are needed for Plating, and that the editor as well as the board will give all help possible to prospective authors. Also, he mentioned that a brochure by **Diveley** will soon be released to outline procedures for the publication of papers.

Ray Dearth, our Librarian for the coming year, asked for suggestions and requests for meeting topics and several suggestions were submitted to him.

Our president then introduced the panel moderator—**Dr. Harold J. Wiesner** who in turn presented the other members of the panel—**Ted Schafer,** Supt. of Plating & Heat-Treat, of Bendix Aviation Corp.; **C. E. Clindinin,** Service Engineer of Crown Rheostat; **Steve Cowdery,** Service Engineer of McGean Chemical Co.

Eugene Roth,
Secretary-Treasurer

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Branch News

SEATTLE-PUGET SOUND

Steel Pittsburgh to Pittsburgh via Seattle

The April meeting of the Seattle-Puget Sound branch was held on April 19, no business meeting was held as a tour of the Washington Steel Products Co., of Tacoma, Wash., was scheduled.

About 75 to 100 persons made the trip to Tacoma, from Seattle, to enjoy the tour of their plant.

Coffee and cake was served after the plant tour and picture, showing in more detail the items manufactured. As a gift each person was given a double spice rack and key chain by the Washington Steel Products Inc.

Item of note was that steel is purchased in Pittsburgh, Pa., shipped by water to Tacoma, fabricated and plated, packaged, and shipped back to Pittsburgh, at a competitive price.

HELEN ARCHIBALD,

SOUTHEASTERN

Strow Gives Talk

Our regular monthly meeting was held on Friday, March 11, at the V.F.W. Club House in Adel, Ga. **H. R. Stogner** presided due to our president's absence, caused by a death in the family. The branch authorized furnishing a list of its members to Redfern representing ASTM for the purpose of trying to increase our membership. The following members were elected to serve as delegates at the national convention: **W. T. Weymouth, Chas. I. Lewis** and **H. R. Stogner;** Alternates: **D. J. Griffin, Bob M. Taylor** and **George W. Taylor.**

Henry Strow, chief chemist and owner of True Brite Chemical Products, Oakville, Conn., gave a very interesting talk on controlled brass plating showing samples of various types of pieces, plated in a controlled solution.

Before the meeting Metal Products and Production Plating Co. had open house. A deep sea fishing trip was enjoyed by some of the boys on Saturday.

Our April meeting was held on Friday, April 8, at the Belmont Steak House. Nineteen members and guests were present with our new president **Clyde Stovall** presiding.

Some discussion was held in regard to our national convention, stressing the fact that the Southeastern had always been well represented. It is hoped we will have a good attendance this year.

A rising vote of thanks was given to our good friends **Geo. and Bob Taylor** for the good time accorded in Adel, Ga., last month through Production Plating.

Very much to our regret our good friend and speaker for the month, **Gene Combs,** was unable to be with us due to the illness of his wife. We wish to extend our sympathy and hope to have better luck next time.

W. T. WEYMOUTH,
Secretary-Treasurer

SOUTHERN TIER

Results of Elections Reported

The Southern Tier branch of the AES held a meeting at the Iron Kettle Inn, Waverly, N. Y., on April 19. The meeting was called to order by President **Zurenda.**

The minutes of the March meeting were read and accepted. Treasurer **Merle Ihrie's** report accepted and complimented by **C. Bound** and **D. Clupper.**

Tellers, **D. Clupper, S. Sambora, S. Smith,** distributed ballots for President. **Roger Wheeler** was nominated for Secretary by **M. Ihrie** and seconded by **S. Stefanski.** Results of the election are as follows: President, **Leonard Rood;** 1st Vice-President, **Charles Harris;** 2nd Vice-President, **Willis Wood;** Secretary, **Roger Wheeler;** Treasurer, **Merle Ihrie;** Librarian, **Stanley Stefanski;** Board of Managers, **George Zurenda,** Chairman, **Ken Ashley, Harold Harper.**

It was voted that the third Tuesday of each month will be our regular meeting night the same as the previous year.

We now have thirty-four members in good standing. Research fund chairman was to be elected. **E. Szymaniak** accepted said position voluntarily. **C.**

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Branch News

Bound gave a summary of the AES Regional meeting in Rochester, N. Y. The next Regional meeting will be held in Buffalo in 1956, and in Syracuse in 1957. It was then suggested that we present the Regional meeting here in Binghamton in 1958.

Austin Fletcher moved that delegates from the Southern Tier AES branch who go to the National Convention vote for the best man.

ROGER W. WHEELER,
Secretary

SPRINGFIELD

Helbig Talks on Purification of Plating Solutions

The Springfield branch met at Blake's Restaurant for the April 25 monthly meeting. The meeting was opened by President **Philip Sanders.**

On a motion sponsored by **Roger Heroux,** it was decided to sponsor the final meeting for the season by a fifty-fifty subsidized dinner to be held at a place different than where the regular meetings took place and where there would be some type of entertainment. **Edward Dupuis** offered to make the necessary arrangements, and it was decided to have the installation and meeting on the fourth Thursday of May, rather than the fourth Monday.

The meeting was adjourned at 7:37 P.M., and the body went into the dining room for dinner.

After the dinner, the balance of the evening was given over to the Technical Session. The speaker was **W. A. Helbig,** a pioneer since 1938 in the purification of plating solutions by activated carbon treatment and by filtration. Helbig is a chemical engineer for the Atlas Powder Co. A very interesting subject, plainly presented, and very well received.

HENRY L. HEISSFELD,
Secretary

TWIN CITY

New Officers Elected

At the April meeting of the Twin Cities branch the following officers were elected: President, **Fred Kaim** (Superior Plating); 1st Vice-President, **Robert Teply** (Northwest Airlines); 2nd Vice-President, **Roy Bierman** (Minneapolis Honeywell); Librarian, **Warren Johnson** (Northwest Airlines); Secretary-Treasurer, **Robert L. Buckley** (Industrial Chemical and Equipment).

Board Members (at large): **George Reed** (Minneapolis Honeywell), **Cort Platt** (Midland Coatings), and **Ben Rosenthal** (Wyandotte Chemicals).

Following the board meeting and dinner an interesting talk on "Specifications and Tests for Electrodeposited Coatings" was given by **C. H. Sample** of the International Nickel Company. An ordinarily dry subject was delivered in an extremely interesting manner by the speaker.

Attending the meeting as guests were: **Chas. Kupelian** and **Jens Hall** of the Jostens Company and **Verne Robinson** and **Jack Neves** of the International Nickel Company. **A. G. Russel,** Western Electric Company, was welcomed as a transfer member to our branch.

WESTERN ONTARIO

Yon Shimizu Takes Over

The regular monthly meeting was held on April 15 in the William Pitt Hotel, Chatham, Ontario. Twenty-five members were present for dinner. The meeting heard a discussion on Vapor Degreasing by **Bob Smith** of Dow Chemical Company of Canada.

Yon Shimizu, the new president of the Western Ontario branch, took over from past president **Les Crookes** at this meeting. Discussion was also held with regard to attending the Toronto branch meeting in Niagara Falls May 7 and the 42nd AES Convention and Industrial Finishing Exposition in Cleveland in June.

ALEX. V. CORBIT,
Vice-President

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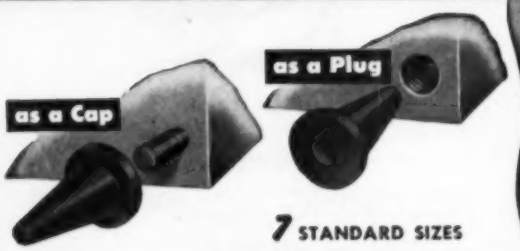

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Lehigh University, Bethlehem, Pa.

Secretary.....P. PETER KOVATIS
445 Broad Street, Newark 2, N. J.

ADELAIDE meets second Wednesday of each month at 7:30 P.M. at the University of Adelaide, North Terrace, Adelaide. Secretary-treasurer, R. J. Down, Room 30, 17 Currie Street, Adelaide, S. A., Australia.

ALLENTOWN-READING meets third Wednesday of each month at 7:00 P.M. in Scotty's Anchorage, Second and Main Streets, Emmaus, Pa. Secretary-treasurer, Edgar H. Iobst, Jr., 163 Main Street, Emmaus, Pa. Research finance committee chairman, Lee C. Wotring, 526 N. Elmo Street, Allentown, Pa.

BALTIMORE-WASHINGTON meets second Tuesday of each month with meetings in Baltimore at the Engineers' Club and in Washington, D. C., at the National Bureau of Standards. Secretary, Carl H. Thiede, 8426 Piney Branch Road, Silver Springs, Md.

BOSTON meets first Thursday of each month in Hotel Statler. Secretary, Dr. George P. Swift, 53 Galen Street, Watertown 72, Mass. Research finance committee chairman, Louis V. Gagnon, 53 High Street, Natick, Mass.

BRIDGEPORT meets second Friday of each month in Barnum Hotel. Secretary-treasurer, Robert G. Parker, 25 Beverly Road, Bridgeport 58, Conn.

BUFFALO meets first Friday of each month in Markeen Hotel. Secretary, E. G. Sampson, Jr., 43 W. Main Street, Falconer, N. Y. Treasurer, R. E. Campbell, 238 Sprague Street, Jamestown, N. Y. Research finance committee chairman to be appointed.

CAPITOL DISTRICT meets first Monday of each month at Panetta's Restaurant, Menands, N. Y., at 7 P.M. for dinner; educational session at 8 P.M. Secretary, Charles Schenk, 1765 Lenox Road, Schenectady, N. Y. Treasurer, John Green, R. D. 1, Thatcher Park Road, Voorheesville, N. Y. Research finance committee chairman, Chester J. Klimek, 16 Southern Avenue, Pittsfield, Mass.

CENTRAL MICHIGAN meets second Tuesday of each month at 7:00 P.M., alternating between Meadow Lark Inn in Jack-

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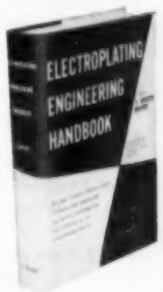

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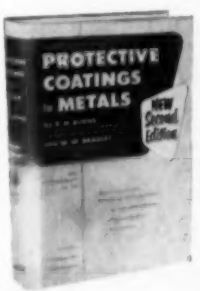

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CHICAGO meets second Friday of each month at 8 P.M. at Western Society of Engineers, 84 E. Randolph Street. Secretary-treasurer, Paul Glab, 882 N. Paulina Street, Chicago 22, Ill. Research finance committee chairman, Charles Geldzahler, c/o Platers' Technical Service, Inc., 509 S. Wabash Avenue, Chicago 9, Ill.

CINCINNATI meets fourth Wednesday of each month at 6:30 P.M. in Engineering Society Headquarters, East McMillan Street and Woodburn Avenue. Secretary, R. K. Evans, 8484 Wicklow, Cincinnati 36, Ohio. Treasurer, G. T. Speers, 1203 Fifth Avenue, Dayton, Ky. Research finance committee chairman, W. Wilson Loveless, 1350 Arlington Street, Cincinnati 25, Ohio.

CLEVELAND meets first Friday of each month in Hotel Carter at 8 P.M. Secretary-treasurer, R. I. Peters, 12901 Elmwood Avenue, Cleveland, Ohio.

COLUMBUS meets first Friday of each month at 8 P.M. in Battelle Memorial Institute Auditorium. Secretary-treasurer, Michael Farr, 1735 Franklin Avenue, Columbus 5, Ohio. Research finance committee chairman, to be appointed.

DALLAS-FORT WORTH meets third Wednesday of each month at 6:30 P.M. in Lennox Hotel, Grand Prairie, Texas, half-way between Fort Worth and Dallas. Secretary-treasurer, research finance committee chairman, A. C. Fricke, 212 Julien Street, Dallas 3, Texas.

DAYTON meets third Wednesday of each month in the Biltmore. Secretary, Richard M. Clinchens, 33 W. Market Street, Germantown, Ohio. Research finance committee chairman, Richard F. Moore, 526 Aberdeen Avenue, Apt. B, Dayton 9, Ohio.

DETROIT meets first Friday of each month in Hotel Statler at 8 P.M. Secretary-treasurer, Edward J. Kubis, Wyandotte Chemicals Corp., Wyandotte, Mich. Research finance committee chairman, R. J. Racine, Wyandotte Chemicals Corp., Wyandotte, Mich.

GRAND RAPIDS meets second Friday of each month at Fingers Restaurant at 7 P.M. for dinner, educational session at 8:15 P.M. Secretary, Don Smith, 1825 Martin, Grand Rapids, Mich. Treasurer, P. Norton, 1119 Orchard, S. E., Grand Rapids, Mich. Research finance committee chairman, R. O. Watson, 3045 Kalamazoo, S. E., Grand Rapids, Mich.

HAMILTON meets third Thursday of each month in the Conference Room, West End Plant, Canadian Westinghouse Co., Ltd. Secretary, R. Burke, c/o Swift Devices, 14 George Street, Hamilton, Ontario, Canada. Research finance committee chairman, W. G. Finlay, 7 Hill Street, Hamilton, Ontario, Canada.

HARTFORD meets third Monday of each month in Hotel Bond, Hartford, Conn., at 7:45 P.M. Secretary, Stanley Platoz, 26 Erwin Place, New Britain, Conn. Treasurer, B. Cohen, 185 High Street, Willimantic, Conn. Research finance committee chairman, Frank Smith, Derby Milford Road, R. F. D. 1, Orange, Conn.

HOUSTON meets third Tuesday of each month at 7 P.M. in the Ben Milam Hotel, Houston, Texas. Secretary-treasurer, H. C. Van Wagner, c/o Barada & Page, 2812 Center Street, Houston, Texas. Research finance committee chairman, O. L. Smith, 2903 W. Dallas, Houston, Texas.

INDIANAPOLIS meets first Wednesday of each month at Fox Steak House, 1207 E. Washington Street. Secretary, Miss Edna Rohrabaugh, 415 N. 23rd Street, Lafayette, Ind.

JACKSON-LANSING: Name has been changed. See Central Michigan.

KANSAS CITY meets fourth Thursday of each month at Roselli's Restaurant at 6:30 P.M. Secretary, Olin K. Bock, 5317 W. 58th Street, Mission, Kan.

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LANCASTER meets second Friday of each month at 8 P.M. September, December and April meetings are held at Hanover, York and Harrisburg, respectively; all other meetings at the Old Mill Inn, Lancaster, Pa. Secretary-treasurer, Harry A. Saylor, 40 N. Poplar Street, Elizabethtown, Pa. Research finance committee chairman, Harry Hovis, Lincoln Highway, W. Lancaster, Pa.

LOS ANGELES meets second Wednesday of each month at 7 P.M. in Rodger Young Auditorium. Secretary, G. Hetz, 152 Clagstand Drive, Puente, Calif. Research finance committee chairman, Tony Stabile, 417 E. 16th Street, Los Angeles 21, Calif.

LOUISVILLE meets third Thursday of each month in Kapfhammers Party House, 1506 S. Shelby Street, Louisville, Ky. Secretary-treasurer, Joseph G. Sterling, 6025 Peggy Drive, Louisville 13, Ky. Research finance committee chairman, R. G. Marshall, 3020 Talisman Road, Louisville 5, Ky.

MELBOURNE meets third Thursday of each month at 8 P.M. in Metallurgy Theatre, Melbourne Technical College, 124 Latrobe Street. Honorary secretary-treasurer, B. Reaburn, Park Road, Ringwood, Victoria, Australia.

MILWAUKEE meets first Friday of each month in the East Room, Hotel Ambassador. Secretary-treasurer, Clifford A. Peters, 4124 W. Southland Drive, Milwaukee, Wis. Research finance committee chairman, T. Hartshorn, 4818 N. Woodruff Avenue, Milwaukee 11, Wis.

MONTREAL meets first Tuesday of each month at 8:30 P.M. in Mount Royal Hotel. Secretary, Jean Monette, 11700 Notre Dame Street, E., Montreal, Canada. Research finance committee chairman, P. M. Coady, 216 Westminster Avenue, Montreal West, Montreal, Canada.

NEWARK meets third Friday of each month at 8 P.M. in Hotel Robert Treat. Secretary, Dr. D. G. Foulke, Hanson-Van Winkle-Munning Co., Matawan, N. J. Treasurer, George Wagner, Hy-Grade Electro Plating Co., 35 Fourth Street, Newark, N. J. Research finance committee chairman, John Gumm, 538 Forest St., Kearny, N. J.

NEW HAVEN meets second Tuesday of each month at Mason Laboratory, Yale University. Secretary-treasurer, B. J. Gaffney, 40 Filbert Street, Hamden 14, Conn. Research finance committee chairman, W. K. Murray, 48 Maple Avenue, Meriden, Conn.

NEW YORK meets second and fourth Fridays of each month in the Statler Hotel. Secretary-treasurer, George Schore, 833 Baldwin Drive, Westbury, L. I., N. Y. Research finance committee chairman, Milton Nadel, 41-15 50th Avenue, L. I., N. Y.

PHILADELPHIA meets fourth Friday of each month at the Engineers' Club, 1317 Spruce Street, Philadelphia, Pa., at 8 P.M. Secretary, I. Wm. Marcovitch, 1302 St. Vincent St., Philadelphia, Pa. Treasurer, Paul Mentzer, Sr., 7242 Bingham Street, Philadelphia 11, Pa. Research finance committee chairman, Herman P. Wright, 194 Atlantic Avenue, Trenton, N. J.

PITTSBURGH meets first Wednesday of each month in the Avalon Room of the Sheraton Hotel. Secretary Irvin H. Scharm, Jr., 4782 Delma Drive, Pittsburgh 27, Pa. Treasurer, W. F. Pizoli, 6833 Meade Street, Pittsburgh 8, Pa. Research finance committee chairman, Myron Ceresa, 207 Highland Road, Pittsburgh 35, Pa.

PORTLAND meets second Tuesday at 6:30 P.M. in Berge's Chalet. Secretary-treasurer and research finance committee chairman, K. B. Humphrey, 2750 N. W. 31st Avenue, Portland 10, Ore.

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ROCKFORD meets second Monday of each month at 7 P.M. in the Faust Hotel. Secretary-treasurer, E. J. Budden, 122 Twelfth Street, Rockford, Ill. Research finance committee chairman, David Stockton, 1511 Warren Road, Rockford, Ill.

SAGINAW VALLEY meets at Zehnder, Frankenmuth, Mich., second Wednesday of each month, September through May, except February, at 7 P.M. Secretary-treasurer, Raymond E. Gittins, 215 N. Birney, Bay City, Mich.

ST. JOSEPH VALLEY meets first Wednesday of each month at 8 P.M. in Hotel Elkhart, Elkhart, Ind. Secretary-treasurer, Harold J. Wiesner, 1016 Osolo Road, Elkhart, Ind. Research finance committee chairman, Arthur G. Wiegand, 181 North Elkhart Avenue, Elkhart, Ind.

ST. LOUIS meets second Wednesday of each month at the York Hotel, 6th and Market, St. Louis, Mo. Secretary-treasurer, Ward W. Kelly, 7046 Deerpatch Drive, St. Louis, Mo. Research committee finance chairman to be appointed.

SAN ANTONIO regular meeting date to be announced. Secretary-treasurer, T. H. Collard, 442 Pilgrim Drive, San Antonio, Texas.

SAN FRANCISCO meets second Thursday of each month alternating between St. Julien Restaurant, 140 Battery Street, San Francisco, and El Curtola Restaurant, 510 17th Street, Oakland. Secretary, B. I. Trygstad, 1727 Oak Street, Redwood City, Calif. Treasurer, R. L. Hefner, 286 Martens Avenue, Mt. View, Calif.

SEATTLE-PUGET SOUND meets the third Tuesday of each month at 8 P.M. at the Stewart Hotel, Second and Stewart, Seattle, Wash. Secretary, Mrs. Helen Archibald, 17560 Tenth Avenue, N. W., Seattle, Wash. Treasurer, R. Becker, 558 First Avenue, So., Seattle, Wash.

SOUTHEASTERN meets second Friday of each month at 7:30 P.M. at the Belmont Steak House, Atlanta, Ga. Secretary-treasurer, W. T. Weymouth, P. O. Box 246, Weaverville, N. C. Research finance committee chairman, C. H. Hohner, Udylite Corp., 1841 Cheshire-Bridge Road, N. E., Atlanta, Ga.

SOUTHERN TIER meets third Tuesday at 7:30 P.M. at the Ah-Wa-Ga Hotel, Owego, N. Y. Secretary, R. W. Wheeler, Austin F. Fletcher, Inc., Box 536, Binghamton, N. Y. Treasurer, M. Ihrie, 14 Pine View Terrace, Sydney, N. Y. Research finance committee chairman, E. Szymaniak, 118 Downs Ave., Johnson City, N. Y.

SPRINGFIELD meets fourth Monday of each month at 6:30 P.M. in Blakes Restaurant, 15 Market Street, Springfield, Mass. Secretary, Henry L. Heissfeld, 74 Chilson Street, Springfield, Mass. Treasurer, G. H. Mangeau, Hampton Ponds, Westfield, Mass. Research finance committee chairman, John E. Costigan, 74 Clairmont Place, Longmeadow, Mass.

SYDNEY meets second Thursday of each month at 7:30 P.M. at 155 King Street, Sydney. Secretary-treasurer, J. Lean, 15 Daisy Avenue, Queenhurst, Sydney, Australia.

SYRACUSE meets third Monday of each month at 8 P.M. in Richard's Restaurant, 106 Ashdale Avenue, Syracuse, N. Y. Secretary, A. G. Martineau, Jr., 1024 Onondaga Avenue, Syracuse, N. Y. Treasurer, Allen A. Gutekunst, 224 Rich Street, Syracuse, N. Y. Research finance committee chairman, K. S. Parnell, 126 Wood Avenue, Syracuse, N. Y.

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TOLEDO meets first Thursday of each month at Park Lane Hotel. Dinner at 6:30 P.M.; meeting at 8 P.M. Secretary-treasurer, Gaston Bergeman, 703 Pine Street, Fremont, Ohio.

TORONTO meets second Friday of each month in Royal York Hotel. Dinner 6:30 P.M.; meeting 8:30 P.M. Secretary, Robert L. Edwards, 1106 Dovercourt Road, Toronto, Ontario, Canada. Research finance committee chairman, K. Wells, 370 Victoria Avenue, Toronto, Ontario, Canada.

TWIN CITY meets first Monday of each month. October through June, in the Covered Wagon (Lodge Room), 114 S. 4th Street, Minneapolis, Minn., at 7 P.M. Secretary-treasurer, Robert L. Buckley, c/o Industrial Chemical and Equipment Co., 205 11th Avenue, So., Minneapolis 15, Minn. Research finance committee chairman, E. H. Lindemann, 1213 N. Leighton, Minneapolis 22, Minn.

WATERBURY meets second Thursday in September through May. Dinner 6 P.M.; business meeting 7 P.M. Technical meeting 8 P.M. Secretary-treasurer, Spencer L. Henn, 99 Ridgeview Place, Cheshire, Conn. Research finance committee chairman, Ellsworth T. Candee, Beach Avenue, Watertown, Conn.

WESTERN ONTARIO meets third Friday of each month at the Bungalo Inn, Lambeth, Ontario at 9 P.M. Secretary-treasurer, Dave Mainland, 21 Maple Street, Chatham, Ontario. Research finance committee chairman, Paul B. Croly, c/o Ontario Steel Products, Ltd., Chatham, Ontario.

WICHITA meeting place indefinite. Secretary, Frank Swift, 2041 North Mosley, Wichita 4, Kan. Treasurer, Leon Lawless, 1211 E. Douglas, Wichita, Kan.

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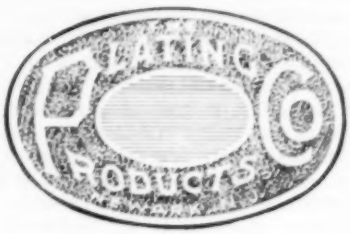

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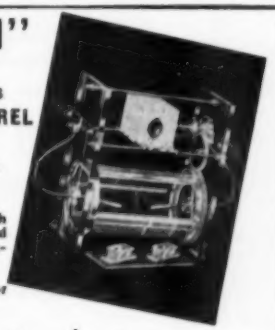

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Future Meetings

June 2-4 —National Society of Professional Engineers, Annual Meeting, Bellevue-Stratford Hotel, Philadelphia, Pa.

June 7-10—American Welding Society, Welding Show and Spring Meeting, Kansas City, Mo.

June 12-17—Society of Automotive Engineers, National Meeting, Golden Anniversary Summer Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 14-16—AIEE, APS, AIME, CIT, Magnetics Conference, William Penn Hotel, Pittsburgh, Pa.

June 16-18—Malleable Founders' Society, Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

June 17-18—American Chemical Society, 8th Annual Analytical Symposium, Syracuse University, Syracuse, N. Y.

June 19-23—American Society of Mechanical Engineers, Diamond Jubilee Annual Meeting, Statler Hotel, Boston, Mass.

June 20-23—**42nd Annual AES Convention and 4th Industrial Finishing Exposition, Municipal Auditorium, Cleveland, Ohio.**

June 20-24—American Society for Engineering Education, Annual Meeting, Pennsylvania State University, State College, Pa.

June 26 to July 1 American Society for Testing Materials, Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 27 to July 1 American Institute of Electrical Engineers, Summer General Meeting, New Ocean House, Swampscott, Mass.

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DATA SHEETS

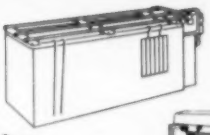
#1 - MACDERMID METAL FINISHING COMPOUNDS
#2 - DYCLENE "E" - Reverse Current Cleaner for Die Castings
#3 - ANODEX 61X - For Cleaning Buffed Copper
#4 - ANODEX - Reverse Current Cleaner for Steel
#5 - ROCHELTEX - For Copper Plating
MACDERMID BRIGHT COPPER PLATING PROCESS
#6 - CHROME RESISTEX - For Cleaning Prior to Chrome Plating
#7 - PRESSURE SPRAY WASHING MACHINE CLEANERS
#8 - CHROMETEX - Nickel Activator
#9 - METEX ACID ADDITIVE
#10 - METEX ZINC STRIPPER
#11 - METEX DURAFOS - Phosphate Coating
#13 - THE ALUMETEX PROCESS - For Electroplating on Aluminum
#14 - TROXIDE - Dry Acid Pickling Salt
#15 - BLACKMAX SALTS - Black Oxidizing Salts for Steel
#20 - METEX DB ACID ELECTROLYTIC STRIP
#21 - MACDERMID ALUMINUM BRIGHT DIP NO. 2
#23 - SOLVENT EMULSION CLEANERS
#24 - COMPOUNDS FOR FINISHING ALUMINUM
#25 - DEOXIDEX - For Cleaning Aluminum for Spot Welding
#26 - MIRROCU - Chemical Copper Polish
#27 - PHOSPHOTEX - Zinc Phosphate Process
#28 - METEX FILTER POWDER
#29 - METEX PAINT STRIPPER T-19
#30 - METEX STRIP AID - For Immersion Stripping of Copper and Nickel
#31 - METEX 157 - Phosphoric Acid Cleaner
#32 - MIRROFE - Chemical Steel Polish
#33 - METEX M-600 - Alkaline Smut Remover and De-ruster
#34 - LUSTRABRASS I
#35 - LUSTRABRASS II

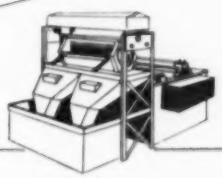
MAC DERMID
★ Incorporated ★
WATERBURY 20, CONNECTICUT

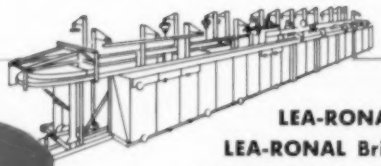
Reviewing Lea-Ronal

PLATING SPECIALTIES

Each helps to provide
BETTER PLATING
LOWER COST or BOTH







***Here are the Big* 8**

LEA-RONAL Bright Copper
LEA-RONAL Bright Acid Copper
LEA-RONAL Bright Nickel
LEA-RONAL Bright Silver—Industrial
LEA-RONAL Bright Silver—Decorative
LEA-RONAL Bright Gold—Industrial
LEA-RONAL Bright Gold—Decorative
LEA-RONAL Bright Cadmium

PLUS ADDITIVE AGENTS

SUPERTARTRAL: better and more economical than Rochelle Salt.

CUPRALL: maximum speed of copper deposition, improved buffability.

WATERSHED: free rinsing and fast drying; reduced or eliminated spotting.

WETTING AGENT CW-6: usable in *all* cyanide copper baths; stable, free rinsing.

TST PURIFIERS: greatly increased tolerance to chromium and zinc in cyanide baths.

LEA NICKEL-GLO: a 'no sludge' agent for barrel plating; minimized or eliminated burnishing of small parts.

LEA MIRRO-GLO: similar to Nickel-Glo but for still tank plating.

These are *all* superior products, proving in production that they do a stand out job of providing better plating, more economical plating or *both*. It will pay you to get *all* the facts. When writing, it would help if you would send data concerning your plating problems. Sample, if possible.

Watch our advertisements for announcement of several new developments.

The **LEA GROUP**
serving the Finishing Field

Lea-Ronal, Inc., Long Island City, N. Y.
Lea-Michigan, Inc., Detroit
The Lea Mfg. Co., Waterbury, Conn.
Lea Mfg. Co., of Canada, Toronto

Plating Polishing Buffing Burning

Lea-Ronal *Inc.*

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Main Office and Laboratory:
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